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ORIGINAL COMMUNICATIONS.

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THE ORBITAL APPROACH TO THE CAVERNOUS SINUS.*

DR. HARRIS PEYTON MOSIER, Boston.

For a number of years, three at least, I have been on the lookout for a case of thrombosis of the cavernous sinus, feeling that the approach to the sinus through the orbit was feasible. Nine months ago, during my last service at the Massachusetts Charitable Eye and Ear Infirmary and under Dr. Crockett as Chief of Staff, a case presented itself. The patient was too sick to make a definite diagnosis, but it seemed probable that there was thrombosis of the left lateral sinus with extension to the cavernous. At operation Dr. Emerson found the lateral sinus thrombosed and dealt with this condition by the usual operative measures, first tying the internal jugular vein. Two days later, no improvement following, and the protrusion of the eye and the edema of the lids increasing, the case was kindly passed up to me.

The plan of the operation which I had in mind was to gain access to the cavernous sinus through the inner half of the orbital plate of the great wing of the sphenoid. The patient gave permission for the removal of the eye. The evening before the operation was spent in preparing for it by work upon the cadaver. At the operation the outer and posterior part of the orbit was exposed by the procedure of Kroenlein. The globe of the eye was retracted inward. A short trial of this method proved that it was

*Read at the annual meeting of the American Otological Society, Atlantic City, May 27, 1914.

not successful in giving sufficient room, and so the eye and the contents of the orbit were removed. Then an opening was chiselled through the orbital plate of the great wing of the sphenoid bone, the brain retracted upward and the cavernous sinus supposedly located and incised. The man died in a few days without any further diagnostic signs and without extension of the process or improvement.

Then came the autopsy which the hospital authorities and the enthusiasm of the house officer made possible. This was the first case in the hospital in which operation upon the cavernous sinus had been attempted. The main point to determine was whether or not the sinus had been opened. In the little group about the autopsy table I somehow felt very much alone. As the saw cut through the left side of the skull cap pus dribbled down the blade, and when the brain was exposed the left hemisphere was flooded with it. Instantly the question was in the mind of everyone, "Did the operation result in a brain abscess?"

On removing the brain, however, the abscess was found in the temporo-sphenoidal lobe, in the typical place, and was due to the extension from the lateral sinus. This abscess had been missed in life, and so, the completed autopsy showed, had the cavernous sinus. Instead of entering the cranial cavity as I had tried to do through the orbital plate of the great wing of the sphenoid, I missed my bearings and had gone too high and had opened the roof of the orbit in front of the lesser wing of the sphenoid and just above the cavernous sinus. I grazed the sinus, but even my loyal house officer could not demonstrate that it had been opened. The dura had been exposed and incised on the under surface of the brain wall back in the anterior fossa. Neither dura nor brain at this point was infected. On cutting into the cavernous sinus it was found to be filled with pus. Such in brief was the result of this operation which I had coveted, an operation which was not undertaken lightly nor without preparation.

Humbled by the outcome of my efforts, I went back to the dissecting room to study the steps of the operation farther. My conclusions are embodied in this paper. I have tried the procedure some ten times. It still appeals to me and my purpose is to make it appeal to you.

ANATOMY.

The cavernous sinuses placed one on each side of the body of the sphenoid bone, and extending from the inner end of the sphenoidal fissure to the apex of the petrous portion of the temporal

bone are of considerable size and of very irregular form. Their cavity is transversed by numerous interlacing filaments which give rise to a structure resembling that of cavernous tissue, and from this circumstance they derive their name. Enclosed in the outer

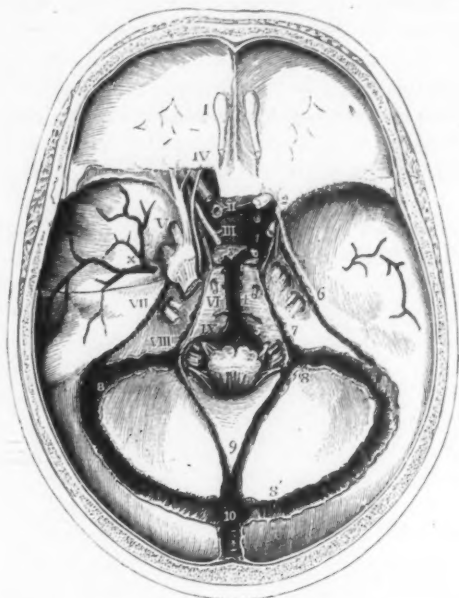


Figure 1. Internal view of the base of the skull, showing the sinuses of the dura mater (Allen Thomson). $\frac{3}{2}$. The tentorium has been removed, and also a small portion of the roof of the orbit posteriorly on the left side, so as to bring into view the sinuses, which are laid open, the arteries at the base of the skull, and the trunks of the cranial nerves.

I, olfactory bulb; II, optic nerves; III, third nerve; IV, trochlear nerve; V, placed opposite to the middle of the three divisions of the fifth nerve; VI, sixth nerve; VII, facial and auditory nerves; VIII, placed opposite to the glosso-pharyngeal, pneumo-gastric and spinal accessory nerves; IX, hypoglossal nerve; 1, right internal carotid artery as it makes its turn within the cavernous sinus in the groove of the sphenoid bone; 2, its ophthalmic branch; 3, right and left posterior cerebral arteries, from the former of which the posterior communicating artery is seen passing forwards to the internal carotid; 4, basilar artery; 5, vertebral arteries giving off the anterior spinal; X, middle meningeal artery spreading upwards from the foramen spinosum; 6, superior petrosal sinus; 7, inferior petrosal sinus; 8, termination of the lateral sinus at the jugular foramen; 8', commencement of the lateral sinus; 9, occipital sinus, in this case of large size; 10, torcular Herophili, and below that number in the figure, the superior longitudinal sinus.

wall of each are the third, fourth and the ophthalmic and superior maxillary divisions of the fifth nerve, as they pass forward to the sphenoidal fissure and the foramen rotundum, and in the cavity of the sinus covered only by its thin lining membrane are the internal

carotid artery, the sixth nerve, and a plexus of the sympathetic. Each sinus receives the ophthalmic veins anteriorly and communicates internally by means of the intercavernous sinuses with the corresponding vessel of the other side, while posteriorly it discharges its blood into the petrosal sinuses. It is also joined by some inferior cerebral veins, and by a small vessel named the sphenoparietal sinus (Breschet) which after receiving a branch from the dura mater and communicating with the middle meningeal veins runs inward on the under-surface of the small wing of the sphenoid bone.

The *circular sinus* is the name given to a venous ring surrounding the pituitary body of the sella tursica and formed by two transverse vessels (anterior and posterior intercavernous sinuses) which connect the right and left cavernous sinuses. Either of the transverse branches may, however, be wanting, but the anterior which is usually larger is the more constant. On the other hand there

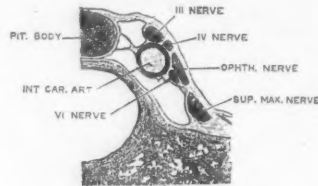


FIGURE 2. Transverse section of the cavernous sinus. (Langer.)

is often an additional vessel passing across below the pituitary body.

The *superior petrosal sinus* is a narrow canal running in the groove along the upper margin of the petrous portion of the temporal bone. Commencing at the back part of the cavernous sinus, it is directed outwards and backwards in the attached margin of the tentorium cerebelli, and ends in the lateral sinus as this turns downward in the groove on the mastoid portion of the temporal bone. It is joined by some inferior cerebral and superior cerebellar veins, as well as by small branches from the tympanum which issue by the petro-squamous fissure.

The *inferior petrosal sinus*, which is much shorter and wider than the superior, passes from the cavernous sinus downwards and outwards in the groove between the lower margin of the petrous bone and the basillar process of the occipital bone. It passes through the anterior compartment of the jugular foramen and opens immediately into the upper end of the internal jugular vein.

The inferior petrosal sinus receives some inferior cerebellar veins and the auditory veins from the internal ear.

Variations of the cavernous sinus: The cavernous sinus is represented in a child by a venous plexus in the dura mater, which by enlargement and fusion of its channels is converted into the characteristic sinus of the adult. In old age the trabeculae diminish and the cavity becomes simpler.*

The sphenoidal fissure: The sphenoidal fissure is bounded above by the lesser wing of the sphenoid, and below by the free edge of the orbital plate of the great wing of the sphenoid bone. In most cases it is a wedge-shaped fissure larger at the inner end or base of the wedge. It is fully two centimeters long. Through it run the third, the fourth, the ophthalmic or first division of the fifth, and the ophthalmic veins. The lower margin of the fissure presents near the middle a small tubercle from which one head of the external rectus muscle of the eye takes its origin.

After the contents of the orbit have been removed and the periosteum cleaned away from the sphenoidal fissure a pair of scissors curved on the flat can be made to enter the fissure at its inner end, and by hugging the lower rim of the fissure it is possible to separate the dura from the outer wall of the cavernous sinus for about a centimeter. It would almost seem as if in many cases the cavernous sinus could be opened at this point without the removal of bone. For surgical purposes, however, it is necessary to enlarge the fissure. This is the essential part of the operation advocated in this paper.

The outer wall of the orbit: The outer wall of the orbit is very oblique: it is formed by the orbital surface of the great wing of the sphenoid and the malar. Between it and the roof near the apex is the sphenoidal fissure. Between the outer wall and the floor, near the apex, is another fissure, the speno-maxillary which allows the superior maxillary nerve to enter the infra-orbital groove from the speno-maxillary fossa. At the anterior margin of the groove the sphenoidal wing occasionally articulates with the maxilla, but frequently is excluded by the malar.

The outer wall of the orbit, to recapitulate, is made from without inward, and for the first third, by the malar bone and for the two remaining thirds by the orbital plate of the great wing of the sphenoid. Only the inner half of the orbital plate of the sphenoidal bone, however, has to do with the cranial cavity—the anterior half, the part which makes the middle third of the outer wall of the orbit, making a part of the anterior wall of the zygomatic

*Quain, Vol. 2, Part 2, pp. 523-r.

fossa. We are concerned, therefore, only with the inner half of the orbital face of the sphenoidal bone, the part which bounds the sphenoidal fissure below and makes the inner part of the anterior wall of the middle fossa of the skull.

OPERATION.

The globe of the eye is removed and then the orbit cleaned out. Then the ophthalmic artery is tied. The periosteum is cleaned from

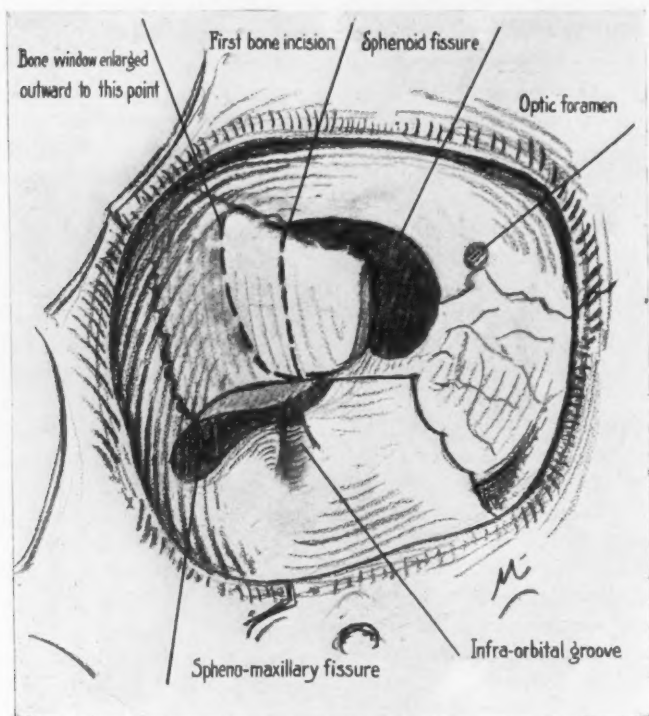


Figure 3. Drawing by author to show the bone incisions for reaching the cavernous sinus through the orbit.

the posterior half of the floor of the orbit and the groove recognized in which the superior maxillary nerve runs. The next step is to separate the periosteum from the orbital surface of the great wing of the sphenoid and to recognize the outer end of the sphenoidal fissure. With the chisel placed vertically a cut is made through the

orbital plate of the great wing of the sphenoid from the notch for the superior maxillary nerve below to the outer end of the sphenoidal fissure above. The bone is thin along this line and is readily removed. It is important to make sure that the whole of the bone making the lower border of the fissure is taken away. The bone opening is enlarged outward one-half centimeter, using either rongeur or chisel. The lower edge of the

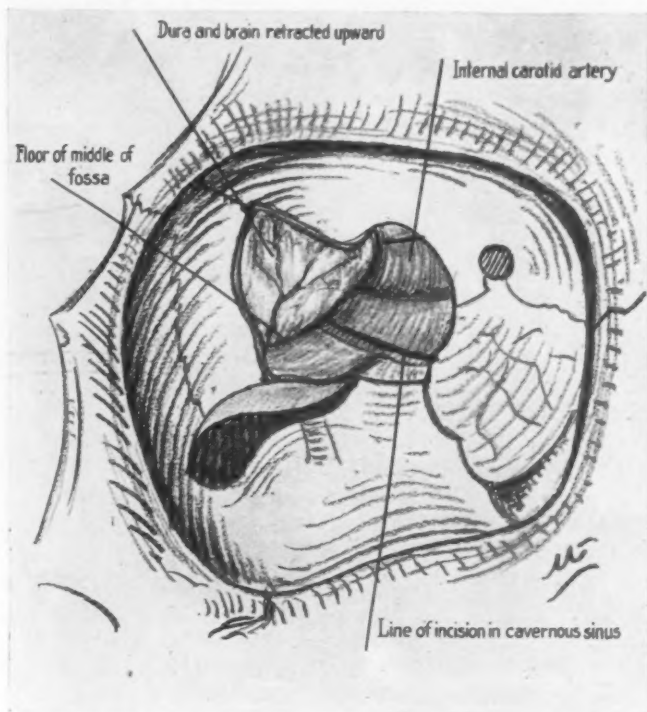


Figure 4. Drawing by author to show the cavernous sinus exposed and incised.

bone window should be brought flush with the floor of the orbit. Unless this is done it is not easy to get at the bottom of the middle fossa from which the dura is to be elevated. The enlarging of the bone window outward is best accomplished, be in this point one-half centimeter in thickness. If the window is carried further outward the zygomatic fossa is opened. The

bone is so thick where the orbital plate makes the apex of the zygomatic fossa that the approach to the middle fossa and the cavernous sinus—by removing first, as I did on the living, the malar bone by the method of Kroenlein and then attacking the orbital plate from without inward—starts the operation on thick bone and makes the exposure of the dura slow. Consequently the operator becomes timid.

Furthermore, there are no landmarks by which to make the bone incision; so the operator may easily, as I did, go too high, and enter the anterior instead of the middle fossa. By making the bone incision as has just been described, that is from the groove of the superior maxillary nerve upward to the outer end of the sphenoidal fissure, the orbital plate of the great wing of the sphenoid splinters off in much the same fashion as the bridge comes away in a radical mastoid operation with the last stroke of the chisel. Having quickly uncovered the dura the operator goes on confidently.

The bone-window, made and enlarged outward and brought flush with the floor of the orbit, the dura is then elevated from the floor of the middle fossa, working from the outer boundary of the bone window inward. On the cadaver the dura can be separated from the outer wall of the cavernous sinus for a distance backward of about one centimeter. Then the separation becomes hard. If the elevation is persisted in at the level of the bottom of the bone-window a pin-head opening is torn in the outer wall of the sinus at this point. I do not know whether this is due to dividing a vein running in the outer wall of the sinus or whether a strand of one of the nerves in the outer wall of the sinus is torn away. Above and beyond this point of adhesion between the outer wall of the cavernous sinus and the dura the two can be separated for about a centimeter further. Then the emergence of the ophthalmic division of the fifth nerve from the Gasserian ganglion halts the separation. If the attempt is made to separate the inner wall of the cavernous sinus from the outer wall of the body of the sphenoidal bone, the knife may have to be used to start the separation, but once it is started it can be carried back easily to the limit of the sinus.

Experimentation makes me feel that the exposure of the outer wall of the sinus, though limited in extent, is the better. Choosing then the exposure of the outer wall of the sinus and having separated the dura from it for a centimeter, a blunt-pointed knife is placed against the outer wall of the sinus on a level with the

floor of the orbit and the knife blade carried forward toward the body of the sphenoid until it is stopped by the bone. This incision opens the wall of the cavernous sinus for one centimeter and is well below the internal carotid artery. Through this incision into the cavernous sinus a small curette can be carried back in the sinus to the opening of the superior and inferior petrosal sinuses, that is through the whole body of the sinus. The distance from the rim of the orbit is on the average between 3 and $4\frac{1}{4}$ in.

Given a cavernous sinus thrombosed or full of pus what would happen in life in my opinion is, that as soon as the separation of the dura from the outer wall of the sinus was begun, the sinus would rupture. The escaping pus would then guide the curette into the cavity of the sinus.

The above operative technic is based upon one failure in the living, to which I owe much, and to which I hope some day one of you will also owe something, and to ten operations upon the cadaver. I believe that it is entirely feasible, that it is something more than a cadaver operation with which the demonstrator caps his operative course and stirs the imagination of the post-graduate student. Its drawback is the necessary removal of the eye. In the serious cases, because there are cases which get well without operation, when a reasonably sure diagnosis can be made the eye is already useless. The patient without operation is doomed. As I look at the question of the sacrifice of the eye both scripture and surgical sense call for it.

The approach to the cavernous sinus through the orbit is the direct and natural way. Enlarging the sphenoidal fissure, which is the essential part of the operative procedure here advocated, is simply opening wider the anatomical gateway through which the sinus emerges from the skull.

828 Beacon Street.

Case of Ozena in a Nursling. PASQUIER. *Jour. de Med. de Paris*. March 7, 1914.

Nursling of 7 months had dyspnea. Crust removed from nose proved to be ozenatous, but the mucosa was not atrophic and the crust not very fetid. The father of the child had ozena. There was no history of lues.

Ed.

FREEZING THE INTERIOR TURBINATE.*

DR. HARRY S. GRADLE, Chicago.

Although not a rhinologist, I have been called upon at various times in my clinical and private practice to relieve intumescent inferior turbinates because of the ocular condition existant. When unable to refer the cases to rhinologists I performed the following small operation which I devised and to which I was led by the wonderful results obtained from freezing various angiomas and ruptured blood-vessels around the eyelids with carbon dioxid snow. The technic of obtaining the freezing mixture is that elaborated by Dr. J. S. Eisenstaedt, dermatologist, and myself.

The intumescent turbinates that shrink to a fairly small size under the influence of cocain and adrenalin are those suitable for the procedure, which is extremely simple. The nose should be thoroughly anesthetized while the snow is being obtained. We use a large carbon-dioxid tank, identical with those used in soda-fountains and saloons. The gas is allowed to escape through a regulating valve into a chamois bag, where it rapidly condenses to a snow of very low temperature. This loose snow is then packed into a half-inch hole, bored through a four-inch block of hard wood. The mold is packed tightly by a loosely fitting piston, pounded by an ordinary hammer. As soon as the snow is tightly packed into the mold, the block is laid on its side and the snow pencil gently tapped out. With a sharp knife, this cylinder is quartered lengthwise so that there results a segment of a cylinder of carbon dioxid snow with one sharp, long edge.

This segment is held tightly in a grasping forceps and introduced into the nose through any sort of a nasal speculum. The sharp edge is pressed against the turbinate, the same as a cautery wire is applied, and held there for about twenty seconds, then withdrawn. A sharp depression, lined with frost crystals, which disappears in less than twenty seconds will be seen in the frozen area. If an insufficient area was thus treated, the snow may be reapplied. Care must be taken not to touch the edge of the nostrils or the septum, and should the pencil fall from the forceps to the floor of the nose it must be immediately blown out by the patient.

Practically no reaction follows the operation. The patient suffers no more inconvenience than from a simple office treatment,

and is not incapacitated from work at all. Occasionally one freezing will be insufficient and a second can be performed at any future period. I have carried out the procedure twenty times and have had to repeat it in two patients only. The results have proved themselves eminently satisfactory. The turbinate thus treated becomes reduced in size without the loss of any mucous membrane and without the formation of any visible scar-tissue, as after actual cautery. The longest observed case is now two years in duration, and there has been no recurrence of the intumescence. I believe the process to be superior to that of cauterization, both in simplicity and in results, and one worthy of a place in the armentarium of the rhinologist.

32 N. State Street.

Submucous Resection of the Lateral Nasal Wall for the Removal of Foreign Bodies from the Maxillary Cavity. W. ZEMANN, *Ztschr. f. Laryngol.*, Bd. 6, Heft. 6, 1914, p. 821.

Up to the present time foreign bodies of the maxillary cavity had to be removed via the canine fossa, as the intra-nasal way was combined with excessive hemorrhage and did not give broad exposure. The writer exposes the lateral nasal wall by elevating the nasal mucous lining, beginning from the apertura pyriformis. By means of a small chisel a small opening is made in the bony wall, whereby care is to be taken not to injure the mucous lining of the antrum. A Freer separator is introduced and the antral lining elevated; thus exposing the lateral bony nasal wall between its sac of mucous lining. The bone is removed by means of a good biting forceps and the double mucous lining incised according to the intended size of the "window."

The removal of foreign bodies from the antrum and simultaneously the treatment of the usually concomitant antrum suppuration may thus be easily achieved.

GLOGAU.

**THE SUBMUCOUS OPERATION FOR CORRECTING NASAL
DEFORMITIES. SYMPTOMS INDICATING OPERATION.
METHODS AND DIFFICULTIES ENCOUNTERED.***

DR. NATHAN P. STAUFFER, Philadelphia.

Deformities of the nose may be caused by displaced or broken nasal bones (Figure 3), or broken nasal processes of the superior maxilla; or several portions of the septum and cartilage may be bent in combination; or the deviation may be due to the cartilage alone.

In these deformities the obstructions in the nares may be high up with the perpendicular plate of the ethmoid touching the middle turbinal. This will prevent air entering the nose or passing to the inferior nares. Or the obstruction may be caused by the vomer leaning against the inferior turbinal (Figure 5). The air enters the nose but on descending to the posterior inferior nares it strikes this combined obstruction-wall formed by the vomer and inferior turbinal and rebounds upon the entering air. These causes force the patient to keep the mouth open constantly in order to get the necessary air-supply. Patients with these deformities frequently complain of recurrent attacks of rhinitis without any history of exposure to infection or to changes of weather. The pressure of a deviated septum upon an already engorged and irritated turbinal will not only produce these rhinitis attacks but also cause annoying and obscure headaches. Other symptoms caused by nasal deformities are peculiar qualities in the tone of the voice as though the patient talked with a closed mouth allowing the tone to linger in the nose, and anosmia caused by the bent septum closing the olfactory fissure. This deprivation of smell is a great hardship.

But the most insidious as well as the most dangerous are referred to the ear. Many of these patients with obstructed nares have an increasing tinnitus with noises so severe as to cause the patient to threaten life. I have found that an early ear symptom due to an obstructed air passage is a lusterless membrana tympani often accompanied by recurring attacks of myringitis

*Read before the Section of Otology and Laryngology at the College of Physicians, March 18, 1914.

which may be followed by acute otitis media or purulent effusions.

Case 1: This case of Mr. G. shows how a submucous operation will correct a disfigurement of the face and a purulent otitis media as well as an illustration of the methods and the difficulties encountered during and after submucous resections. I hope this will help some other men as I could not find any literature to aid me in my earlier difficulties. Mr. J. G., a patient of Dr. B., was referred to me with the following complaints: Badly bent nose disfigurement; inability to breathe through left nostril; mouth-breather at night with crust-formations in throat upon arising, and a chronic purulent otitis media of many years' duration.

Examination of nares disclosed a protrusion of the cartilage into the vestibule of the patient's right nares and a concavity



Figure 1. Case 1 before operation (May 21, 1913).

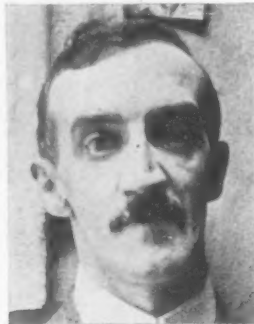


Figure 2. Case 1 after operation (June 21, 1913).

in the middle of septum, while the left nostril was entirely occluded by the cartilage, the vomer and the perpendicular plate of the ethmoid making a convexity which pressed against the inferior and middle turbinals so that not even a probe would pass.

Right ear had a large central perforation in the inferior half of the membrana tympani from which foul pus discharged.

Operation methods: May 2, 1913, at 9 a. m., under strict asepsis, I operated using local anesthesia, saturating the cotton-tipped applicators in adrenalin (1-1000), and then after squeezing out the excess fluid dipping applicator into the powdered crystals of cocain. I massaged the septum for twenty sec-

onds and repeated this in three to four minutes. This gives very satisfactory anesthesia and patients never complain except when removing the vomer.

Where the bend of the septum is at a very acute angle and dissection is difficult or impossible, you may get anesthesia beyond by injecting submucously a one-half of one per cent solution of cocain and a few drops of adrenalin (or one per cent so-



Figure 3. Nasal deformity and deviated septum occluding left nostril. Patient unable to breathe through nose. Before operation. (Courtesy of N. Y. Med. Journal.)

lution of novacain). This submucous anesthesia has the added feature of making dissection much easier. By pushing the needle through the cartilage to the opposite side you can anesthetize without withdrawing the syringe.

I usually start my incision in the patient's left nostril as I find working right-handed this method is easier and most satisfactory. But in this case I was forced to start on the right side because the cartilage protruded out of the vestibule clear to the alae of right nostril, preventing retraction of the mucous membrane sufficiently to allow an incision on the convex side, at least

none which would include the protruding and also the obstructing cartilage.

The incision of the muco-perichondrium far forward often starts an annoying hemorrhage which slows up your operation. Unless you pack this with adrenalin and cocain and wait about one to three minutes you will be delayed by a blood-obscured field. This incision was along the whole end of the protruding



Figure 4. Case 2 after operation. Perfect breathing established in nose.

cartilage which was then pushed to the left and the dissection was made on the patient's right side first. The cartilage was then pushed far over to patient's right and the dissection made on the patient's left side as far as the cartilage would allow by bending it over. The points of the greatest concavity and convexity have always been the most difficult dissections. I have found the method advised by Glas (Vienna) very good—the long Killian speculum blades by rocking will quickly strip the muco-perichondrium from the cartilage to its point of union with the periosteum. To loosen this the method of cutting along the top of the vomer recommended by Neuman I have found very

satisfactory (some prefer the sharp dissectors of Freer which practically cut the periosteum loose), although I find the sharper the dissector the greater the danger of perforation; hence I usually use Ballinger's heavy dissectors in the nares in preference to sharp ones.

The concavity in this nose like many others was at a right angle (the convexity touching the left inferior turbinal) and



Figure 5. Effect illustrates how a deviated septum will cause headaches by pressure on middle turbinal and act as a constant irritation. (Courtesy of N. Y. Med. Journal.)

in trying to round the concavity I tore through, but as the convex side was intact there was no need to worry about a perforation. The cartilage was then removed to the tip of the angle of the concavity, and with this out of the way the dissection was more easily proceeded with. The vomer had a large bend low down extending deep into the posterior nares.

Frequently the removal of the vomer is followed by profuse bleeding and you must pack the pouch with adrenalin and wait again for several minutes. I have found the self-retaining speculum of Killian (Lentz modification) to be a great help in hold-

ing deep into the muco-perichondrium. This gives a good view deep into the pouch and frees you of the worry of tearing the mucosal sides. The chisel with a few strokes usually loosens the vomer and a Middleton or an Eves forceps will pry it loose. The perpendicular plate is next attacked and with the Jansen-Middleton biting-forceps you can take off exactly the amount which forms the convexity.

The method of rocking the ethmoid and breaking it I consider dangerous and apt to loosen more than you desire. In Figure 2 the vomer and a great portion of the ethmoid was necessarily removed, resecting clear to the post-nares. When the cartilage and the bone had been removed the nose had returned to a straighter position.

Further examination revealed pus in the left nares discharging over the anterior end of the middle turbinal.

Packing: After cleaning with 1-5000 permanganate potassium the Bernay-Simpson sponge tents were inserted after anointing them with Beck's bismuth paste. I cannot bring myself to adopt the German method of no packing whatever as I fear some would bleed profusely after the effect of the adrenalin and cocain subsides. The Austrian gauze method is safer and you can sleep easier. The Bernay-Simpson sponge tents are better for the reason that you can co-apt the edges of the incision or any tears much better than when inserting the gauze. In inserting gauze it is apt to roll or pucker, or pull the wound edges apart. Several cases which were slow in healing were caused by the gauze rolling up the mucosa when inserting it, or when removing the gauze it would adhere to the wound edges, then tear and thus start granulations which cause synechia between turbinals and septum. If this does occur you may be compelled to replace the Bernay tent in for several days after douching nostrils.

My observations have led me to believe the muco-perichondrium is much swollen the following days, in many cases just a simple reaction hyperemia, in others a marked hematoma. This is relieved by making a counter-puncture in the muco-perichondrium far back, at time of the operation. Others show a mucosa which is almost purple the following days.

There are two other methods of packing after the submucous resections which I like, that of Dr. George Fetterolf who wraps gauze around the metal splint which permits the patient to continue breathing, and that of Dr. O. A. Lothrop (Boston) which

consists of chain-stitch mattress sutures of catgut through and through the muco-perichondrium and no other method of packing. This prevents the pressure headaches and the constant irritation and sneezing which oftentimes annoys the patient. The sutures are started high up posteriorly to the anterior nares and repeated until the floor of the nares is reached. Dr. Howe of Brooklyn reports twenty-five cases of this latter method and says, "Shock and depression was far less. Free nasal respiration through one or both sides began within thirty-six hours in 80 per cent of the cases. Hematoma did not occur in a single instance and no bleeding sufficient to need the operator's attention or medical assistance."

Post-operative treatment: Mr. G. was sent home with instructions to take a hot bath and alcohol rubs, to remain in bed with an ice-bag to the nose and to eat light food. That night at 12:30 a. m. I was called on account of the bleeding. I found some oozing which was stopped when the dressing was pushed in tightly.

Three days following this operation patient's pulse became 100; temperature 101° F.; slight headache, septum was swollen a half-inch in thickness, patient unable to breathe through nose. I incised mucosa high up and low; found blood but no pus. The following day the mucosa of the septum was more swollen. I opened the original incision and introduced forceps higher up, whereupon several ounces of pus gushed forth. I irrigated the septal pouch daily for three weeks with 1-5000 bichlorid solutions before this pus ceased. I believe this infection was caused by the pus from the left ethmoid cells previously noted. The mucosa for a few weeks longer was very much thickened and indurated, both vestibules tightly closed, but hot compresses three times a day with salt solution intra-nasally, finally reduced it in size and on September 19, 1913, he reported with a perfectly straight nose (Figure 4) and able to breathe perfectly day and night. His ear discharge has also ceased as a result of the submucous operation.

Operation for exostosis of nasal bone: In case 2 (Figure 3) there was a deviated septum with marked external deformity. Some of the same difficulties were encountered, one demanding that the septum be removed clear to the post-nares, but no infection occurred. This case proved interesting for another reason. The operation was done under general anesthesia and as the hemorrhage is always annoying I desired to use adrenalin and cocain but could not find any records of their effect on the circulation. I had the resident keep a blood pressure record and found the adrenalin and cocain had little

effect as the blood pressure never varied much but remained between 125 and 135 during the operation.

This patient had been operated upon in the Dublin Hospital by the U-shaped incision but the obstruction recurred and the operation was unsuccessful as the patient could not breathe. After the submucous resection had permitted the introducing of other instruments I next attacked the hump on the left side of the nose which was due to an exostosis of the nasal bone. This hump was removed by placing my left first finger externally on the nasal bone and with the knife cutting subcutaneously up through the nostril. Then a small dissector in the nostril lifted up the periosteum and skin and with Ballenger's reverse spoke shave chisel I removed the hump. In doing this, care must be exercised to keep from breaking through the skin or the bridge of cartilage left to support the nose.

Conclusions: This operation is much better handled with the patient conscious, as he can give help by turning the head, and while he has a very bad cocain headache the following day, it is nothing compared to the ether nausea combined with a cocain headache and gauze packed nose.

Dangers: The submucus operation should be done only after the operator has taken a course on the cadaver, as its routine employment by those unqualified will bring our profession into disrepute. I have seen some very large flaps of muco-perichondrium removed from the nose under the impression that they were cartilage. This major operation is only for those who have spent some years in nasal work and have become thoroughly familiar with the anatomy and proper surgical methods. Patients have died from meningitis following it. I have seen a colleague's patient develop meningitis and die within a week after the operation. A United States senator who succumbed is another illustration. It should be performed only under the most rigid antiseptic precautions.

Perforation: A troublesome complication at the time of the operation is a perforation. If the perforations are made at the exact spot and through both mucosa and not closed at the time of the operation the hole tends to become larger, growing usually to about the size of a ten cent piece and then stops. Some patients have perforations and never know it and are never inconvenienced by it. I have several patients who have perforations in noses which *have never been operated upon* at any time in their lives and the patients never knew of

the perforations. Their only complaints were a slightly stopped up nose and crust-formations at other times.

The Yankauer curved needles are excellent for closing perforations at the time of the operation. If you overlook the perforation or it develops later from replacing gauze or splints, the method of Marschek (Vienna) is very satisfactory—a flap is dissected immediately under the perforation into the floor of the meatus, leaving a large pedicle pulled up and through the perforation and anchored on the other side. The important part is not to pack tightly as you want the edge of the flap to bleed. The flap can also be taken from the inferior or middle turbinal.

Contra-indications: Many times you are called upon to decide whether a young child should have a submucous resection. Some authorities claim it should not be done before the fourteenth or fifteenth year; but the question arises whether it is not better to run the risk of some failure of bone development rather than subject the child to constant colds, deficient oxygen, formation of mouth-breathing habits, deformed alveolar arches, purulent otitis media or sinus complications. If there is total occlusions of one or both nares, or markedly obstructed breathing which will produce worse symptoms than the chance of the septum properly developing, then no matter how young, the child should be operated upon.

In tuberculosis patients I have refused to operate until the family physician has given permission and the patient's temperature kept normal for a month.

Some surgeons have done a submucous operation with no relief to the patient and have wondered why they failed. In many cases it is due to allowing a hypertrophied turbinal to remain. When we have a large cavity on one side of the nose the turbinals endeavor year after year to fill up the vacuum and an overgrowth of one or both turbinals ensues. Now when you straighten this bent septum and do not at the same time remove a portion of this overgrown turbinal you only change the obstruction from one nares to the other. You will ask, is it necessary in all cases of submucous resection to do a turbinectomy? Some noses will get enough air by the simple submucous resection and removing the offending deviation; others have caused such prolonged irritation that the turbinals are hypertrophied and unless you resect a good-sized portion of the middle, or posterior end of the inferior with the snares or scissors you will not give your patient relief. I find that in packing the turbinec-

tomy cases you get free bleeding if you remove it before the second day. If you use iodoform gauze the chances of infection are less, and no rise in temperature is noticed and no foul odor is observed and you may allow it to remain two days.

In closing I want to emphasize the use of plenty of hot compresses externally, hot irrigations of Dobell's solution intranasally, and absolute rest in bed for forty-eight hours and a replacing of the Berney-Simpson sponge tents for the second twenty-four hours, or Lothrop's mattress sutures. Post-operative swelling or prolonged thickening of septal mucosa is thus avoided. I would call your attention to the relief obtained by this operation if well done (by that I mean the removal of all the bent portion), in the disappearance of headaches, clearer thinking, better sleeping, better sense of smelling, improved hearing, relief of recurrent rhinitis, and improved voice. External deformities of the face can be corrected in some cases by the submucous resection alone as is shown by Figure 2.

218 South Twentieth Street.

Exercises to Strengthen Expiration in Treatment of Asthma.

L. HOFBAUER. *Deut. med. Wchnschr.*, May 28 1914.

Hofbauer holds that the basis of most cases of bronchial asthma is an emphysema which in turn has caused faulty respiration. Educational means for correcting this have been successfully employed. The apparatus used regulates the duration of the respirations, the periods of expiration being gradually lengthened and those of inspiration shortened. During expiration the patient is asked to hum a note at a constant pitch; thus insuring uniform forcible expiration of definite duration. Respiration must take place solely through the nose.

Ed.

THE OBSERVATION OF NYSTAGMUS THROUGH THE CLOSED EYELIDS.*

DR. EDMUND PRINCE FOWLER, New York City.

The anterior portion of the eye-ball is the segment of a smaller sphere than is the posterior portion, and consequently the cornea projects from the sclerotic, somewhat in the same manner that a watch-glass does from its case. In different people and at different ages the degree of curvature varies, but at all times it is sufficient to enable one to follow movements of the eye-ball in every direction, though the eye-lids be closed.

By placing the index and middle fingers upon the closed eye-lid, one on each side of the cornea, nystagmic movements of the eye-ball may be detected by touch.

By placing the diaphragm of a phonendoscope (or such like instrument) upon the closed eye-lid, to one side of the cornea, nystagmus may be detected by hearing. By the unaided eye nystagmus may be detected, unless the eye-lids be unduly thickened. No doubt these facts are of common observation, but so far as I am aware no use is made of them in otology.

By observing nystagmus through the closed eye-lids, several real advantages are gained:

1. The eye muscles are at rest, and no accommodation or fixation occurs. Thus all patients may be tested under equal conditions in so far as these uncertain and disturbing elements are concerned.
2. There being no effort at fixation, after-rotation nystagmus endures from twice to three times as long as when the eyes are opened following rotations. Thus a longer and hence a more accurate guide is furnished for the rotation tests and nystagmus may be aroused by weaker galvanic and caloric stimuli.
3. During vertigo there is an involuntary tendency to close the eyes and to keep them closed, as this lessens in some measure the dizziness. Thus if the eyes are kept closed during the nystagmus tests, we psychologically and physiologically contribute to the patient's comfort by diminishing his vertigo.
4. By the use of suitable indicators properly attached to the eye-lids, the eye movements may be magnified a hundred fold; thus making for ease and accuracy of observation.

*Read at the twentieth annual meeting of the American Laryngological, Rhinological and Otological Society, Atlantic City, June 19, 1914.

5. Upon properly placed revolving drums, or moving sheets, such indicators may be made to graphically record nystagmic movements of both eyes, during and after rotation of the body. Thus a means is provided wherewith to estimate not only the duration of nystagmus during and after rotation, and the caloric and galvanic tests, but to study the magnitude, frequency, gradations and variations of nystagmus in both eyes under different conditions. Such a study cannot fail to contribute something to our understanding of vertigo and allied phenomena. A study of the modifications of nystagmus in disease is by the means I have outlined made possible, and a nystagmogram may be preserved for future reference.



Figure 1. Tracing of nystagmus during rotation, with eye-lids closed. Note its quick inception and subsidence in this case.



Figure 2. Tracing of a wink during the latter part of a nystagmus. Note opposed directions of the waves.

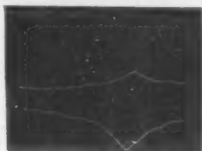


Figure 3. Nystagmograms of both eyes taken simultaneously. Note the coincidence of the waves and that the number of nystagmic movements may be counted.

That the inertia and momentum may be practically nil, I have been using for this purpose paper or straw indicators, one end stuck to each eyelid, usually to the nasal side over the junction of the cornea with the sclera. (Z. O. plaster or auto tire cement are satisfactory adhesives.)

If the indicators are properly placed it will be seen that they respond readily to slight motions of the eyeball (rectilinear and rotatory*).

I call attention to one disturbing element in this method of observation; the winking or twitching of the eyelids, and that these motions are always opposed to one another. Thus the movements of two indicators appear twice as extensive as does the movement of

*Due to the short rectilinear component, always associated with the rotation of the eye-ball. This is more marked when the eyes are closed.

but one. This is clearly recorded upon the tracings. After a little practice one is able easily to distinguish these from nystagmus oscillations. Moreover they are unrythmic. For nystagmographic tracings, I use a sphygmograph mounted upon a hockey puck, the latter held between the teeth of the patient, and the blackened paper ribbon fed from the rear towards the front (away from the patient). I submit several nystagmograms made with this improvised apparatus to show its practicability.

616 Madison Avenue.

What Becomes of the Operated Sinuses? E. J. MOURE. *Rev. hebdomadaire de Laryngol.*, April 4, 1914.

Upon opening a number of frontal and maxillary sinuses, previously operated and in which thorough curettement of the mucosa had been practiced, Moure found the cavities entirely filled with a kind of fibrous tissue, the bony walls themselves having grown towards one another. In fact the sinus seemed to have disappeared.

In view of this, it is evident that to operate and cure sinusitis all that is necessary is to make an opening of sufficient size to thoroughly inspect the interior and then to curette the mucosa, whether infected or otherwise,—an essential feature in order to obtain post-operative obliteration. For this reason, the Caldwell-Luc operation for the maxillary sinus and the Ogston-Luc for the frontal will remain the ideal when the suppurating cavities require an external operation.

A mutilating operation, in which an effort is made to at once obliterate these cavities is not necessary. The important point is that the whole mucous membrane should be removed. In fact, after complete curettement, the cavities should be wiped with a 10 per cent solution of chlorid of zinc to complete the destruction of any remaining mucous membrane.

In chronic frontal sinusitis it is important that the ethmoidal cells should be cleared by way of the natural passages and should be the preliminary stage of the external operation.

The post-operative obliteration of the maxillary and frontal sinuses has been experimentally demonstrated by Ssamoylenke in the clinic of Simanowski of St. Petersburg. SCHEPPEGRELL.

THE OPERATIVE TREATMENT OF MENINGITIS.

DR. SAMUEL J. KOPETZKY, New York City.

"Septic conditions are usually surgical opportunities, and demand surgical treatment." Thus Dr. Irving S. Haynes prefaces his argument presented before us in 1912, advocating the trial of "Drainage of the cisterna magna" to cure certain types of purulent meningitides.

The operative treatment of purulent meningitis has undergone scientific inquiry ever since the above statement was made, and it is my present purpose to present the position *now* held, both by Dr. Haynes and the writer, after two years of further study and experience with meningitic infections, so as to complete our records before this society.

In 1912, following the lead of pioneer work from many competent sources (see historical review of Haynes article, Transactions A. L. R. and O., Society, 1912) and adequately to meet the shortcomings and the objections which practical application has demonstrated existed in all previously devised methods of technic to effect a similar object, Haynes perfected a procedure which afforded drainage to the infected central nervous system and at the same time effected decomposition of the brain and relieved the handicapped vital centers in the medulla. It was common knowledge that bacterial invasion of the central nervous system resulted in an infection of the cerebro-spinal fluid with the accumulation in this fluid of purulent exudate. It was demonstrable at autopsy and reported upon by many observers, that the larger proportion of cases presented pus-accumulations along the base of the brain and more specifically involved the posterior cranial fossa. Clinical evidence of compression was a concurrence habitually observed at some time in the course of the disease. The excellent results Sofian obtained by removing the infected cerebro-spinal fluid and by decreasing intra-cranial tension before injecting anti-meningococcus serum, and, finally, the sporadic cures of other types of meningitides which obtained through the withdrawal by lumbar and ventricular punctures and different ways of decompression—all these were factors which gave support to the opinion that the crux of the situation presented in purulent meningitides lay in the successful

*Read at the twentieth annual meeting of the American Laryngological, Rhinological and Otological Society, Atlantic City, June 19, 1914.

evacuation of pus-accumulations and the eventual restoration of an unhindered blood-supply to the vital medullary centers.

The operation, premised upon this line of reasoning, was undertaken by us and by a number of other surgeons, and reports of the cases operated on are a matter of record.

The additional prerequisite to success was thought to be a very early institution of this surgical relief before the disease had exhausted the patient and general sepsis had supervened. To this end much work and study was expended in disentangling the complex picture of meningitis so as to give data upon which an early diagnosis might be based. Even with all these conditions squarely met in our own hands, the establishment of drainage and its accompanying phenomena failed to secure the desired end.

Critical study of the cases operated on presents the basis for the opinion that meningitis is not simply a surgical problem, to be solved by finding a safe method by which to eliminate the pus-accumulation in the cerebro-spinal fluid and to establish intracranial decompression; the analogy between the situation presented in purulent involvement of the meninges and infections of the peritoneum, or the pleura, does not hold.

In the central nervous system we have to deal with elements and factors, partly anatomic and partly physiologic, whose importance we have only come to comprehend since employing the operation on the human body. In the peritoneum or the pleura these elements are absent. In the central nervous system we have the arterial and nervous systems, and in addition we have the cerebro-spinal fluid secreted in the ventricles and actively circulating and eventually emptying into the venous system. Added to its other activities, this fluid, passing over the brain surfaces and interspaces, performs the function of carrying away from the brain cells the products of brain metabolism. To maintain its mechanism intact a closed circuit seems necessary. An opening into this closed system at any point, and permanently keeping the gateway open, stops the usual flow of this fluid stream over its customary courses by changing the stream's direction. Thus do I account for some of Dr. Day's observations at autopsy.

While it is perfectly true that drainage of this fluid has been accomplished by lumbar puncture, by operations on the vertebrae, by ventricular punctures, the drainage of the cisterna magna by the method we advocated opened the flood-gate much more widely and probably maintained it open for too long a time. The even, generalized support which this water-bed affords to brain surface

artery and vein walls, and to the loosely connecting strands of the pia mater, is removed rather abruptly. Significant in this connection is the heroic effort which the human economy makes at replacement when the cerebro-spinal fluid current is interrupted at any point in the cycle of its circulation. For example: In cases of cerebro-spinal flow through the cribriform plate into the nose, the fluid has been collected and gallons of it have been found to be secreted in this effort of Nature to maintain a given degree of fluid-pressure in the skull. In decompression operations we have observed dressings and pillows saturated for days, Nature making the effort to keep a certain amount of fluid-pressure at par within the skull. The advocates of repeated lumbar puncture as a therapeutic measure count on this very act of replacement by a fluid of assumed higher bacteriacidal properties to help combat the infection.

Finally, it is of importance to note that in two of the cases which recovered after drainage of the cisterna magna, one operated upon by Day, a circumscribed meningitis and cerebellar abscess, and the other of pneumococcus meningitis, operated on by Beck—that but a scanty amount of cerebro-spinal fluid escaped after the first twenty-four hours.

Comprehending the import of these facts and studying the clinical material upon which the operations were performed, makes it an inevitable conclusion that the criterion of our successful surgery does not rest upon the establishment of drainage, *per se*, of the central nervous system. Whether or not some further modification of technic will meet the situation, as we now see it after two years' further study, remains, for the present, unanswered.

Finally, another factor inherent to the issues involved in purulent meningitis needs study. Operation does not control this situation at all! Our previous knowledge of this state was meager indeed! Its importance has only become emphasized through the study we were enabled to make of the course and character of the disease when the compression-factors were removed by operation. I refer to the inflammatory reaction in the brain-substance themselves—which is termed "cerebritis." The change in the brain-tissue is a factor of great moment in the aspect of the situation we are discussing!

Ewing W. Day, in the analysis of the cases presented before us last year, made the important observation that "the clinical course of suppurative meningitis, when subjected to the cisternal drainage, was divisible into three distinct periods": 1. The period of

invasion; 2. The period of improvement, and 3, the period of sepsis. Our study substantiates this observation, but, with the explanation offered by Day regarding these events, issue is taken, in part, at least. Day calls attention to the diversion of the fluid from its normal channels, and contends that, 'because the fluid is diverted and no longer passes over the infected brain-surfaces, leaving the skull after operation by the route of the cisterna magna, the toxins are no longer washed into the circulation and the fall of temperature with the consequent period of improvement supervene. Furthermore, since all of the infection entangled in the meshes of the arachnoidal spaces does not drain back to the cisternal opening, therefore these remaining foci, unovercome by Nature, spread the infection and usher in the final period of sepsis.

In the first place, we are by no means certain that the third period habitually observed in such cases is one of sepsis. In the second place, to accept Day's reasoning, it would have to be conceded that the infection spreads within the skull, *en masse*, along the arachnoidal spaces—a supposition by no means accepted as fact.

Let us examine both these questions for a moment, referring briefly to some factors bearing on the argument: Were it true that the infection spread *en masse*, washed onward by the flow of the cerebro-spinal fluid from whichever place witnessed its original entrance into the skull cavity, then how account for the usual finding of the greatest purulent exudate, collected at the base of the brain and in the posterior cranial fossa, and this in spite of the fact that the direction of the flow of the cerebro-spinal fluid is away from the base and upwards toward the Pacchionian bodies and the superior longitudinal sinus?

Additional contradictory evidence is furnished by many autopsy reports from both otogenic and traumatic meningitides, where an infection of the meninges was by contiguity assumed—one would expect the greatest pus-collections to be found adjacent to the site of the fracture of the skull in the one instance, or in the neighborhood of the ear-structures in the other instance.

I believe that the larger number of intra-meningeal invasions are brought about by the hematogenous route, and I think that in otogenic meningitis the mechanics of infection are analogous to those which are found in the tuberculous and the meningococcic types of meningitides. (See Elser and Hulton, *Journal of Med. Research*, Vol. 20, No. 4, June, 1909).

If we accept this hypothesis, then the improvement is not dependent on the lack of toxins generated and washed away from the blood-stream, but is due to the remission of symptoms wholly due to decompression effects on the vital centers, and the unembarrassed blood-supply to the brain tissue as a whole.

I showed in my paper, two years ago, that an edema of the brain-tissue presented itself as an accompanying phenomena of the compressed blood-supply; an analogy is found in the kidney, where edema of its tissues are immediately and strikingly relieved by the simplest expedient of splitting the capsule of the kidney and relieving the compressed blood vessels. (Martin H. Fischer, "Nephritis.")

The infected brain-tissues areas are still in a condition of inflammatory reaction, and the disease continues to a fatal termination, without, however, presenting the usual clinical picture. This reasoning is further substantiated by clinical studies of cases which ran a very atypical course. They have been observed and reported on by a number of clinicians. In these cases the patient suffers an endocranial infection, but the disease runs its entire course without any physical signs of cerebral compression. The suspicion of meningeal involvement is presented sometimes only by a feeling of "non-well-being," accompanied by headache. Occasionally there is a mild temperature curve. T. Passmore Berens and Ewing W. Day reported on such cases before the American Otological Society in 1913, and Dr. Dwyer also commented on having observed such cases. And since my interest in meningeal infections I have carefully followed a number of such cases throughout their clinical course. In the majority of those I saw, the streptococcus mucosus capsulatus was the invading organism. One could hardly realize that these patients, in some instances able to be up and about, were suffering from a disease which would terminate fatally, as they all did. A few hours before death supervened, prostration, coma, convulsions and exacerbations of temperature presented. The chemical and cyto-diagnosis of the cerebro-spinal fluid, and subsequently the bacterial findings in it gave the data for the hopeless prognosis, and premised the diagnosis.

My purpose in reverting to this type of meningitis here is to make the point that these cases present the exactly analogous condition to that of the patient suffering from the usual type of meningitis on whom the cisternal operation has been performed; they are in the same status as these patients during the so-called period of improvement, and their final clinical exhibitions of symptoms simulate the so-called terminal or third stage of the operative cases.

From this we deduce that the period of improvement really marks no advance toward the road of a cure of the meningitis, but it is only an evidence of the control of the pressure-factors in the case. That the final stage is not one of sepsis the study of the patients suggests. These patients, even when they ran high temperature curves, did not present themselves to us as individuals suffering from sepsis. The blood examinations which we conducted in this stage were uniformly found negative for cultures on various media.

The manner of death differs from that of a death by sepsis; the patients all suddenly die, without paralytic phenomena. It seems as if an unknown element suddenly overwhelmed them; death comes on very suddenly, not at all with the prolonged period of grave prostration, etc., which we see in other septic conditions. For example, in the case operated on by me, from the service of Dr. Phillips at the Manhattan Eye, Ear and Throat Hospital, the patient was sitting up in bed, drinking water, which he had called for; there had been no involuntary urination or evacuation of the bowels, etc.; the man seemed in full control of his functions.

The only death which I have seen which simulated these was a case where, in the removal of a goiter, the manipulation of the tumor had evidently set free so much thyroid secretions that, on the day following the operation, the patient suddenly was overwhelmed, and when, one minute before there was evidence of all life's activities, two minutes later there was no life appreciable.

I contend that the manner of death is significant of the inflammation of the brain-tissue, which is progressively advancing in nature, and that when the cells composing the brain itself are affected to a given degree, unknown in its definitiveness by any means at present at our command, then life ceases because its governing, controlling and co-relating centers are inherently prevented from continuing their functional activity.

Much work on this line, which, to be productive, must include an exhaustive study of the metabolic tissue changes in the brain, remains to be done.

These conceptions regarding meningitis have been won because we employed the operation of cisternal drainage and carefully studied the conditions which resulted from the operation. In-so-far as this newly acquired knowledge may serve as a stepping-stone toward the eventual solution of these additional problems the operation of cisternal drainage may yet mark an epoch in our efforts to combat the ravages of this disease.

A few comment from the practical side of the question are now in order: In our first communication we presented the conception

that meningitides resolved themselves into two distinct types of cases, the one in which brain-pressure symptoms predominate and overshadow the entire clinical picture, the other a type in which the so-called pressure-symptoms play but a small role, but where the clinical picture is one produced by bacterial intoxication and poisons from the accumulation of the disarranged brain-tissue-cell metabolism.

The meningitis whose clinical picture is overshadowed by pressure-symptoms, the so-called "Meningitis serosa maligna" of Dietl, Boeninghaus and Phillips—is the type of less frequent occurrence. In the reports presented by Day, Dench, Emerson and Beck, and in the ensuing discussions on these reports, I fail to find one case of this type. Personally I had under observation, and operated on, one such case, but, here too, the relief of the pressure-symptoms did not prevent the fatal termination of the case. Life, however, was appreciably prolonged over the time in which we had been wont to see it last. It is only fair to add that the outcome of one case submitted to the operation gives us no determining data as to the value of the operation in this class of case.

Regarding much of the reports in our literature, details essential to make a critical study are lacking along the lines which I have mapped out for myself and, therefore, with due respect to the observers' reports, I submit that their evidence is too often unconvincing as to the nature of the lesion which they were submitting to the test of operative intervention. Results obtained from operation in such cases are valueless from every standpoint.

The writer forbears to subject to a more critical review those cases which appear to him to be incorrectly diagnosed, because they appear in our literature as brief outlines of case-histories rather than fully described case-reports, and the data upon which the given diagnoses were based are not available in the reports.

All the remaining case-reports seem to be such as did not develop pressure-symptoms as a dominating element in the disease, but presented evidence of advancing bacterial and toxic effects, and symptoms which we have come to regard as general sepsis. It was never contended that drainage of the cisterna magna *per se* would effect a cure in this type of case.

The writer's experience is limited to having operated in six cases, and to having studied five others in most of which he assisted at operation. Dr. Haynes' experience is limited to seven cases in which he operated—these cases, excepting one already referred to, all belonged to the second type of meningitis.

What has been accomplished by the operation of drainage of the cisterna magna besides permitting a keener insight into the nature and character of the course and type of the disease? The operation has saved lives. In the cases reported, both by Day and by Francis P. Emerson, rupture of cerebellar abscesses—not previously known to exist in the cases—and evacuation of the abscess' contents by way of the cisternal route, made possible the recovery of these patients. Had the cisterna magna not been opened in these cases general meningeal infection would, in all probability, have resulted from the eventual breaking of the abscess into the cerebro-spinal fluid, which would have carried the pus-elements throughout the central nervous system.

Finally, the case reported by Beck in the *Illinois Medical Journal*, November, 1913, and referred to in our transactions of last year. In it he gives the story of a brilliant success in saving life in a case where blood-pressure readings and other findings closely corroborate the reasoning adduced in support of this surgical procedure. The patient, a young woman, recovered from a general meningeal pneumococcus infection.

The importance of this case is apparent when its history is read in juxtaposition to the statement of Professor Preysing in his resumé on meningitis, presented to the Otological Society of Germany in 1912, wherein he says that "in his study of literature he finds pneumococcic meningitis to be a universally fatal disease."

The cases reported as operated on, and heretofore published by other surgeons, the cases operated on by Dr. Haynes and by myself, all died in spite of operation after a variable period extending from a few hours to a few weeks. In my own cases every effort was made to arrive at a very early diagnosis, but even this very early intervention of surgical effort did not bring the hoped-for relief.

We believe that the operation should not be discarded entirely. It may prove a useful measure in selected cases, and if ever the other factors entering into the problems presented in meningitides come to solution this means of operating will probably find renewed use because of the easy access it permits to the parts affected.

With the statement that "he who says it cannot be done is apt to find himself interrupted by some one doing it," I desire to register my optimistic belief that we are on the right road, that the surgical treatment of meningitis has advanced our comprehension of the disease we are trying to overcome, and that, eventually, means will be found to lessen the mortality percentage in this grave condition.

616 Madison Avenue.

THE PROPER FIELDS OF MEDICINE AND SURGERY IN DISEASES OF THE UPPER AIR PASSAGES.*

DR. JOHN A. THOMPSON, Cincinnati, Ohio.

One-half of all the diseases it is our daily work to treat are curable by medicinal means alone. With a specialty developing as rapidly as ours has done in the last thirty years it is only natural that most of our programs at society meetings and most of the papers contributed to our journals should deal with diagnostic problems and operative technic. Since treatment is or should be so large a part of our daily task is it not time to give to rational therapy some of the thought and study we have heretofore devoted to surgery? He is a poor laryngologist who sees in every new patient only fresh operative material, or who believes all disease of the upper air passages should be surgically treated.

An intelligent use of known methods in medicine will often prevent complications that make operation necessary. For example, acute rhinitis and la grippe can both be aborted if treated intelligently at the beginning of the attack. The patient whose attack is aborted does not develop an acute purulent sinusitis or otitis media. He escapes consequently a possible mastoiditis, sinus thrombosis, meningitis or brain abscess. Is it not as much our duty to those who trust us, to prevent these possible complications, as it is to do a successful operation after they have developed? Are we not better surgeons when we save our patients the necessity for an operation than when we do one skillfully?

The common diseases of the nose and throat are easily separated for treatment into three classes: First, those the treatment of which is purely surgical. These are deformities and deflections of the septum nasi, chronic sinusitis, all tumors, benign or malignant, adenoids, hypertrophied tonsils, quinsy, foreign bodies, hemorrhages, retro-pharyngeal abscess and stenosis of the larynx. In some of this class preliminary treatment makes the operation easier and the recovery surer.

Before doing a submucous resection of the septum the nose should be treated until the overlying mucosa is as healthy as it

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is possible to get it. Over the convex portion of the deflection or at the anterior end of a spur will usually be found a diseased condition which the text-books ignore. The epithelium is eroded, the surface is covered with scabs. Around this surface is a congested area. The membrane in the involved region is thin and fragile, does not separate readily from the cartilage, and tears easily. If the line of incision passes through the diseased membrane, stitches will tear out of it. This condition, I believe, to be a chronic eczema. It can be cured by the use of a salve containing a dram each of borax and boric acid to the ounce of vaseline. The patient should apply this salve twice daily. If there is so much congestion that bleeding occurs when the scabs are removed, applications three times a week of a 12 per cent solution of silver nitrate should be made. With this disease cured, the submucous resection is much easier to do and the liability to perforation is much less.

In the folds of adenoids there is always muco-pus. In the crypts of hypertrophied tonsils there are always foci of infection. There will be fewer cases of complicating otitis media after operation, less hemorrhage at the time of operation and less fever during convalescence, if we treat the diseased tonsils and adenoids a few days and free them of most of the infectious discharge, before operating.

The second class includes diseases where combined medical and surgical treatment is necessary for a cure. The most important, because the most frequent disease in this class is hypertrophic rhinitis. The removal of the newly formed connective tissue in the turbinates is easy. But it will form again in other places unless the chronic inflammation that produced it is treated and cured. The first step in treatment is cleansing the mucous membrane. The best solutions for this purpose are those described by Wyat Wyngrave in the *Annals of Otology, Rhinology and Laryngology*, August, 1902. With a rational formula given in this article for every condition we treat, it seems strange to the writer that laryngologists will continue to buy by the gallon proprietary remedies that are less effective and much more expensive than the solutions suggested by Wyngrave.

After cleansing the membrane of the accumulated secretions what remedies will cure? We have congestion both of the superficial vessels and of the turbinal bodies. The membrane is hypersensitive like all inflamed tissues. The secretion over the surface is filled

with bacteria, some saprophytic, some pathogenic. The indications are for an analgesic germicide that will at the same time relieve congestion. Menthol meets all these requirements. In solution, it is a germicide in proportions of 1-1000. It is a local anesthetic. While it may cause congestion of the overlying mucosa, clinical observation shows that it lessens the circulation of blood in the turbinate bodies and the flow of mucus from the glands. It is a rubefacient if too concentrated, and the oily solutions for the nose should rarely contain over one per cent of this drug. Usually three grains to the ounce is better.

Camphor is similar in its local action to menthol and can be advantageously combined with it. Five grains to the ounce is enough for ordinary use. The mixture is more agreeable if flavored with oil of cloves.

Tertiary syphilitic ulcer is another disease requiring combined treatment. To the ordinary cleansing wash a small amount of potassium permanganate should be added. Diluted hydrogen peroxid solutions must often be used to loosen the tenacious offensive scabs in this condition. After the dead bone, exuberant granulations and polypi have been removed, touching the cleansed surface with a 10 per cent nitrate of silver solution and then covering it with powdered thymol iodid, has been the most successful treatment.

In chronic granular pharyngitis surgery will destroy the granulations but will not cure the chronic inflammation that produced them. After normal nasal respiration has been restored, applications of zinc chlorid from five to fifteen grains to the ounce of glycerin, have given the best results. In making this solution, it must be remembered that a little C. P. hydrochloric acid is necessary to prevent the zinc precipitating out as an oxychlorid and leaving the solution inert.

Edema of the glottis is another disease requiring combined surgical and medical treatment. Diuretics and diaphoretics internally should be given early. After scarification, the bleeding may be increased by steam inhalations containing tincture of benzoin. Later, sprays of adrenalin solution will relieve the congestion, lessen the swelling, and hasten the recovery of the patient.

Of the diseases of the upper air passages that are curable by medical treatment alone acute rhinitis is the most common. Without bacteriological examination it is difficult to distinguish the simple from the influenzal type of rhinitis. The differentiation is not important as both yield to the same treatment. An ordinary attack

lasts from seven to ten days. If there is an underlying slight chronic inflammation, the attack will be prolonged to three weeks of misery for the sufferer. Intelligently treated, a cure can be obtained in from twenty-four to forty-eight hours and the patient saved days and weeks of annoyance as well as freed from the liability to dangerous complications. Many chronic inflammations may also be prevented if the patient is told how to treat his colds. It has been my custom for years to say to a patient whom I had treated for hypertrophic rhinitis, chronic pharyngitis, chronic laryngitis, chronic trachitis, chronic bronchitis, with or without asthma, at his last visit, "Come back the first day you feel a cold beginning, and I will prevent a return of your chronic disease." Many patients have acted on this advice. Some I have watched for twenty-five years. I see them only at such times as they feel a beginning attack. In none of them can any trace of the old chronic disease be detected, except in a few of the chronic laryngitis cases where the cords had thickened before I saw them. As the years pass I see less of them because they rarely "catch cold." Some professional voice users who have been the most faithful in following the line of treatment indicated come in only once or twice a year.

The treatment ordered to abort an acute attack, with variations to suit individual conditions, is first a sweat. It does not matter how this is induced, either by exercise, a Turkish or Russian bath, the ordinary tub bath and hot drinks, a vapor bath or by drugs. A free perspiration is the essential thing, however it may be induced. Saline cathartics help in this eliminative process and in restoring the normal circulation in the different body areas. Of the drugs that may be given aconite, gelseminum, Dover's powder and aspirin are the best. The first two are so depressant that they are rarely used. The old favorite absorptives for a cold, quinine and the salicylates, are not safe remedies for the patients we see, as many of them have old otitic complications that are aggravated by these drugs. If your patient can be persuaded to remain in bed for a day after the sweat it will benefit him greatly.

To open the nose blocked by the swelling a 1-8000 solution of adrenalin may be used every three hours. If the vehicle used to dilute the adrenalin is a saturated solution of boric acid add a non-irritating antiseptic to your treatment of the infected membrane. Adrenalin solution diluted in this way will not decompose. The shrinking of the turbinates and the mucosa by this treatment permits normal drainage of the sinuses and keeps them healthy. The adrenalin spray should be followed in five minutes by the insuffla-

tion of a powder containing two parts by weight of boric acid and one part of zinc stearate. It forms a protective coating to the inflamed membrane and is actively antiseptic. Where the patient is seen in the second stage of the disease and the serous discharge from the nose is annoying, a spray containing one grain of atropin to two ounces of liquid petroleum is very effective. The alkaloid, not a salt, must be used in this prescription. Atropin acts locally on the glands. It is not good treatment to check the action of all the glands of the body by giving any form of belladonna internally when a local action is desired. The patient should be cautioned not to use this solution too freely in the nose or it will have a disagreeable mydriatic action.

For the third stage of acute rhinitis we need an active antiseptic powder that is not irritating. This formula is yet to be discovered.

Our recent text-books usually give a formula containing oil of eucalyptus, thymol, menthol and camphor dissolved in oil for the treatment of this third stage. The first two and the last two drugs differ so much in their local action they should never be combined in one solution. Thymol and eucalyptus are active stimulants to the circulation when used locally and are contra-indicated in acute inflammations. The cooling anesthetic effect of the menthol and camphor is co-incident with shrinking of the turbinates.

The acute catarrhal sinusitis that often accompanies acute rhinitis will be either prevented or cured by the treatment for the primary disease. Where a sinusitis is present during an acute rhinitis, when the patient first comes for treatment the only additional measures needed are the local applications of cocain solutions about the normal openings of the sinuses and dry heat externally for the relief of pain.

Acute laryngitis is promptly cured by the abortive measures recommended for acute rhinitis. Inhalations of compound tincture of benzoin, a dram to a pint of boiling water, have a magical curative effect in many cases.

Simple chronic rhinitis produces no obstructive lesion in the nose and there is no indication for surgical intervention in uncomplicated cases. In the intumescent type of chronic rhinitis the nasal obstruction is due to dilatation of the turbinated bodies and there is no new-formed tissue to remove. The congestion of the turbinates is not a sufficient indication for their removal. A cure by treatment takes a longer time than symptomatic relief by operation, but one method preserves and the other destroys the important physiological function of the nose.

In simple chronic rhinitis we are treating an inflammation that is present twenty-four hours of every day. It cannot be cured by visits to the specialists two or three times a week. The patient himself must be given an effective remedy to use at least twice daily so as to get a curative influence acting almost as continuously as the pathological one. The solution originally recommended by Hare* (menthol, grs. III; camphor, grs. V; petrolat liq., oz. I) has been a very efficient one in the hands of my patients for many years. In intumescent rhinitis, which is only an early stage of hypertrophic rhinitis, some additional treatment is needed. There is a dilatation of the venous sinuses of the turbinated bodies. This results in the escape of white blood corpuscles into the tissues and their organization into connective tissue. Weak solutions of adrenalin contract the blood vessels and prevent the formation of new tissue. If the solution is not too concentrated there is no paralytic dilatation following its use as often happens with cocain. It can be repeated with the same tonic effect as massage or electricity would have on the unstriped muscular fiber of the turbinated bodies. Many cases of intumescent rhinitis can be cured by adrenalin combined with such general treatment as the individual patient needs.

Patients with chronic purulent rhinitis are rarely seen in the specialist's office. They are very common in the clinics where uncleanly people from unsanitary tenements come for relief. These children are difficult to handle; so in our clinic work we have adopted a treatment the mother can use at home. She is given a salve containing a dram each of borax and boric acid in an ounce of petrolatum. A lump of this salve the size of a pea is to be placed in each nostril when the child takes its afternoon nap and when it retires at night. The heat of the body melts this salve and if the child is kept on his back the whole diseased area is covered. The borax dissolves the crusted discharge and the acid cures through its antiseptic action. The only other treatment is washing out the nose with a warm 2 per cent sodium bicarbonate solution in the morning, in patients where the discharge is very free. A cure will be obtained in from four to six weeks in all uncomplicated cases.

Atrophic rhinitis is probably misnamed. There is nothing in the course of the disease to show that it is essentially inflammatory. The clinical picture is that of a disease of nutrition with intercurrent attacks of inflammation. Where a pathological process is destructive from the beginning no sane reason can be given for adding to it a surgical destruction of the diseased tissues. Our cura-

*System of Therapeutics.

tive efforts must seek to increase the nutrition by increasing the blood supply without enough irritation to cause inflammation. If the remedies which increase the nutrition are at the same time antiseptic and odorous, we have met all the indications that our present knowledge of the disease gives us.

Such a combination is thymol one grain, oil of eucalyptus one dram, liquid petrolatum enough to make two ounces. This combination used after the nose is cleaned, noticeably reddens the membrane without causing inflammation. It is destructive to the saprophytic bacteria and molds that swarm in the accumulated secretions. The odor of this combination is pleasant and overcomes the disagreeable stench of atrophic rhinitis better than anything I have ever found after years of experimenting. The patient herself should use this remedy twice or three times daily and usually after months of treatment all the disagreeable symptoms will disappear. The natural oil of eucalyptus must be used, as the synthetic oil is very irritating. The iodine treatment often recommended for atrophic rhinitis causes so much irritation that it hastens the destructive changes. Ichthyol relieves symptoms by its disinfectant action but it does not give the necessary stimulus to nutrition.

Chronic laryngitis, chronic trachitis and chronic bronchitis should be considered, as they should be treated at the same time. Chronic bronchitis has not been considered a disease that laryngologists should treat but there are good reasons for saying he can do more for these patients than the internist can. The prevention of inflammation in the lower air passages by restoring normal nasal respiration is familiar to us all. We have given little attention to the cure of chronic diseases in the lower air passages by direct treatment. It is easy for the trained laryngologist to apply remedies directly to the diseased mucosa in all parts of the lung and to know the composition of his remedies has not been changed. Of all the expectorants the internist uses, only one, chlorid of ammonium, reaches the lung in the form it is given. We can apply the knowledge of mucous membrane therapy gained by the observation of diseases in the nose and throat to the treatment of chronic bronchitis with much better results than can be obtained by internal treatment. An additional reason for treating these three diseases by tracheal injection is found in the fact that if chronic laryngitis is treated alone, frequent recurrences are caused by acute exacerbations extending up to the larynx from the bronchi. Cure the trachitis and bronchitis and the larynx remains well. Bronchiectatic cavities can be disinfected by the per-

sistent use of tracheal injections and these patients freed from their annoying cough, offensive breath and chronic sepsis.

Years of clinical observation of asthmatic patients have led to these conclusions. All asthmatics have chronic bronchitis, some with dilated bronchi, pulmonary emphysema and dilated hearts. An asthmatic paroxysm is always preceded by an acute exacerbation of the chronic bronchitis. Give the appropriate tracheal injections in the intervals between the paroxysms and you will relieve or cure the asthma.

In a paper presented to this society in 1897 I gave the details of this treatment. The only change in the solutions there recommended, that has stood the test of years, is the addition of monochlorphenol to the remedies used. There are several allotropic forms of this drug. The one used is the liquid orthochlorphenol. Monochlorphenol is also our most potent remedy in acute follicular tonsillitis. In the Christ Hospital frequent epidemics of this disease have disabled the nursing corps just when they were most needed. Irrigations of the throat every three hours with water as hot as it can be borne, followed by a spray containing 2 per cent of monochlorphenol in oil has shortened the duration of the attacks one-half and has lessened their severity.

In a few cases of erysipelas of the nose and throat that I have treated the same solution has been very effective.

Vincent's angina yields very slowly to our older remedies. Two recent cases were relieved of pain in twenty-four hours and all membrane disappeared in seventy-two hours after treatment was begun with a 2 per cent trituration of salvarsan in glycerin.

The experiments of Dunbar (*Annals of Otology, Rhinology and Laryngology*, 1905, p. 310) have given us a basis for a rational therapy in hay fever. He has shown that only the portion of the pollen that is soluble in alkalin solutions is irritating to the mucous membranes of susceptible people. The ideal treatment of hay fever is, of course, to send the patients to regions where they are immune. But working-people cannot leave their employment annually for the necessary six weeks or two months. A treatment that will allow them to live comfortably at home is a blessing to many. The following system of treatment has given this result in more than 50 per cent of my cases. Enough boracic acid is added to the cleansing wash used to make the solution slightly acid. After cleansing the nose it is sprayed with an adrenalin solution varying in strength from one in five thousand to one in eight thousand as the individual case requires. Five minutes later a powder composed

of zinc stearate one part, boric acid two parts, by weight, is blown into the nose. The powder serves a double purpose. It forms a protective coating over the irritated membrane. It keeps the secretions of the nose acid for a time and prevents the solution of the irritating portion of the pollen. The patient himself can use these remedies three or four times daily, and if he begins early in the attack, the disease rarely becomes severe enough to disable him. Conjunctival and bronchial complications must be treated at the physician's office.

A discussion of the therapy of the rarer diseases of the upper air passages would make this paper unreasonably long. We do not need many remedies to get results in the medicinal treatment of such diseases of the upper air passages as are curable without surgical intervention.

As an illustration of how much may be done by simple means I will report one case. The boat-house keeper on the lake in Michigan, where my summer home is located, had tuberculosis. One day while working on the engine of my boat he said: "If some one would stop the tickling in my throat I would get well. It keeps me coughing all night, and I have no chance to sleep or gain strength." Examination of his throat showed the catarrhal laryngitis that so often complicates pulmonary tuberculosis. I gave him an atomizer and a prescription for the menthol camphor solution previously described. It stopped the throat cough and allowed him to sleep. In the next five weeks he gained twenty-five pounds in weight. When I examined him a year later there were no signs of consolidation in the lung and there was no inflammation in the throat. Two years after the treatment was given he weighed 220 pounds and was a picture of health and vigor. A little thing, the curing of a throat cough, turned the scales in his favor. But it was not a little thing for his family to keep its bread winner and for his community to keep an honest, intelligent, progressive citizen. All laryngologists who study treatment as they study operative technic can show many such cures.

628 Elm street.

THE AIR WE BREATHE—A STUDY OF TEMPERATURE, HUMIDITY AND DUST CONTENTS.*

DR. THOMAS HUBBARD, Toledo, Ohio.

I venture out of the valley of tradition in selecting the subject-matter for the conventional address and in so doing I sincerely hope that I may not be accused of setting a bad example. Our program is usually a model of concentration and this is one road to perfection, but if we are to keep in intimate harmony with the spirit of the times we must occasionally ascend the hills and take a broad look around.

Prevention of disease is not a defined special art. It is a creed of medicine, and if you analyze your life's work you will find that you have the highest pride not in brilliant surgery, nor in invention or experimental research, but you will temporarily assume the patient's point of view and measure your real efficiency by a broad standard of health conservation.

Laryngology is exalted in modern medicine in that its part in prevention is to protect the main portal of entry of the body. It is to-day a dependable guardian of the welfare of the child—and as such, duty fulfilled, it leads in health conservation. The brilliant results credited to our special art are in themselves evidence enough that we are doing foundation-work, that is, correcting and strengthening vital functions.

Why do we devote so much of our thought and energy to attain right breathing? Bad breathing was formerly regarded more or less as a matter of inconvenience and an esthetic offense, but to-day we realize that normal respiration is a dominant factor in development, survival and ultimate physical and mental efficiency. Man inhales thirty to forty pounds of air daily and actually absorbs more than two pounds of oxygen—this is more than the total proteids ingested. Another index of the relative importance of the respiratory function is the fact that 80 per cent of total food energy is used in heat production. Oxidation is the essential bio-chemical source of heat. Thus we see that respiration is the main source of caloric energy and this alone expresses its importance as a vital function. We are essentially promoters of right breathing.

*President's address delivered at the thirty-sixth annual meeting of the American Laryngological Association, Atlantic City, May 25, 1914.

Air is not a commercial commodity, as is our "daily bread," but healthful air is not always to be had without taking thought and spending money as we do for "creature comforts" and that is precisely what we are called upon to do. The solution of the problems of ventilation, or more particularly the preparation ("conditioning" is the new term) of the air we breathe, awaits only the consensus of scientific advice, and ours the duty, a special duty I should say, to not only help establish heat, ventilation and humidity standards but also to aid in educating public opinion. Architects and engineers are prepared to fulfill any reasonable demand.

Ventilation has reached a highly developed state and I mention it only incidentally as my theme is rather a consideration of *temperature, humidity and dust content*. We are concerned chiefly with the effects on the respiratory mucosa of these three varying qualities of the air we breathe, and we naturally give particular attention to the developmental period. The child spends all but a few hours of the day in the cold months within four walls breathing air artificial as to temperature, humidity and dust content and the physiologic habits are formed in this environment.

Temperature: Fire was man's first friend—that is, conservation of body-caloric by artificial heat started the evolution of the higher nervous system, but, to carry this logic to an absurd extreme, one cannot say that mental precocity is in direct relation to the ingenuity in inventing and utilizing heating apparatus. Based on this theory the inhabitants of the Northern and Middle States might claim, for instance, that they are at least 10 degrees more progressive than Europeans. Heating and ventilating contracts in public school buildings specify 70 degrees in America, and in England 60 degrees. They might raise the question as to which temperature-standard favors the more rapid expansion of the intellect. Are we really 10 degrees hotter on the trail of Truth?

It is interesting to follow the gradual change that has taken place in our own country during the past half century in artificial heat standards. In 1820, American text-books gave 50 to 55 degrees F. as the healthful, comfortable temperature of the living room and nursery (and I should add in passing that the natural relative humidity, taking into consideration the methods of heating,—luminous heat and direct radiation, the open fire-place, ovens and the Franklin stove—would probably be

about 40 per cent. In 1850, the comfortable temperature was stated to be 62 degrees F. and in the next thirty years it was raised to 72 degrees F. Now should we consider this 17 degree change (55 to 72) a triumph of man's increasing dominance over the elements, or are we on the contrary 17 degrees decadent in physical vigor? Our ancestors of two generations ago would have considered 72 degrees the proper temperature for the aged and infirm, but not for youth. This whole record is a commentary on ingenuity in invention and extravagance in burning up natural fuel resources. (The base burner and hot air furnace were invented about 1840.) Again I must mention humidity in this connection. The moisture in the air of a building at 70 degrees F., (this applies particularly to public school buildings and places of sedentary employment) would naturally be below 25 per cent relative. Therefore, if we were to state that in the period from, say, 1825 to 1875, we reduced the standard of humidity from 40 per cent or 50 per cent relative to 25 per cent or less it would be a more significant fact from the hygienic standpoint than to call attention to the 17 degrees increase in temperature during that period. In other words, we have worshiped a false god of comfort,—Fahrenheit. Rather too mercurial!

The difficulties of natural ventilation (that is, by windows, etc.) are immensely increased at 70 degrees with minus 25 per cent relative humidity standard. Drafts of outside air are unendurable because the velocity of the incoming air is in direct relation to the relative differences in temperature, and further, the contrast in temperature and particularly in humidity is so marked that it produces real discomfort. A strata of cold humid air (80 per cent relative) of considerable velocity about the lower extremities produces a disturbing local chill and the rest of the body, including the nasal mucosa, is experiencing 70 degrees with 25 per cent relative humidity. The essential fact, to which all will agree, theoretically and from experience, is that a standard of 70 degrees and higher, with necessarily low relative humidity, makes efficient natural ventilation almost impractical. At a temperature of 65 degrees with humidity 40 to 50 per cent relative, the perception of the drafts of natural (window) ventilation is less. It is not dependent on merely the difference of 5 degrees in temperature. The water vapor in the air of the room is an equalizer of heat radiation. It

tempers sudden changes. The figures, 70 degrees with 25 per cent relative humidity and 40 degrees with 80 per cent relative humidity—that is, the room temperature and the inflowing air **from** an opened window—graphically express the complex disturbance (we may call it shock) of the heat-regulating functions, the same having been made more delicate by being habituated to the hot, dry atmosphere. In passing I should mention that the hot air habit has resulted in absurd fashions in the matter of protective clothing. This is a big factor in the causation of acute and chronic catarrh.

We should study *humidity* not as a secondary ingredient of the atmosphere, but as an entity. Water vapor exists in the air not passively but positively. The vapor pressure of the air is as definite as barometric pressure. Air does not absorb moisture, but on the contrary its presence in the air in varying quantities is dependent on the relative vapor pressure. In other words, dry air coming in contact with a moist surface becomes more humid because of the natural tendency to equalize vapor pressure and not because the air is hygroscopic in the same sense that is chlorid of calcium. Keep that property clearly in mind. For this constitutes the difficulty in artificial humidification. *There is no natural attraction between air and water vapor.* Vapor diffuses more rapidly in a vacuum than in air. The terms "water hunger air," "dessicating air," and even "saturated air" are mere figures of speech but they are convenient and rather indispensable terms in the discussion of this subject and they should not be interpreted literally.

A few figures (not altogether dry ones) will illustrate the difficulties of maintaining a healthful degree of humidity in buildings heated to our present standard. But first a few words concerning *humidity standards*. This is a very broad subject if we attempt to consider it as applied in the industries and public buildings in general. It is better to limit the scope of the discussion to school buildings and dwellings and places of sedentary employment. The mechanical problems involved in the artificial regulation of indoor atmosphere are complex. It is impractical to attempt a perfect imitation of natural conditions. The consensus of opinion is that 40 to 50 per cent relative humidity is a healthful and practical compromise. As stated, the difficulty of proper humidification arises chiefly from the fact that the temperature standard is inordinately high.

Here are some of the figures: A cubic foot of atmospheric air can hold, at 30 degrees F., 2 gr. of water-vapor. That is, 100 per cent relative humidity. At 70 degrees it can hold about 8 gr. of water-vapor—an increase of about 6 gr. per cu. ft. and at 80 degrees about 11 gr. If we heat air, temperature 30 degrees, having 80 per cent relative humidity (an average condition in cold weather) up to 70 degrees its relative humidity drops to about 20 per cent. The problem presented is to add enough moisture to maintain 50 per cent more or less at 70 degrees F. A nine-room house, cubic capacity about 30,000 cu. ft.—air changed once an hour (about twenty times daily, the minimum rate of change consistent with warming it by indirect radiation)—would require about twenty gallons of water to be added daily to the warmed air. *About a gallon an hour.* A very considerable amount—in fact it would be quite impractical to evaporate this amount by natural methods, such as ordinary evaporating pans on registers and radiators. The evaporating pan heated by small caliber steam coils immersed in the water will impart to the air in the furnace or air ducts a sufficient amount of water-vapor. This apparatus is used in large plants with forced ventilation. The evaporating pan has been successfully adapted to the ordinary hot-air furnace—a large copper pan over the dome, the essential feature being a continuous automatic supply of water by gravitation from a reservoir outside the furnace. The objections to live steam as the source of humidity are the disagreeable odor and the noise. Its use is limited to large buildings. The humidistat is quite practical and satisfactory in control of the artificial humidifiers, especially the steam injector type. The atomizer type of humidifier is used successfully in certain factories. The air is first dried by freezing and then a definite amount of water is sprayed into the rewarmed air maintaining any desired degree of humidity. But all this is for a visible profit, and health conservation as a commercial asset cannot command such expenditure. It is evident that the whole problem of moistening the air to the healthful standard is made difficult and in many instances impractical by the unnaturally high temperature standard to which we have drifted. It is the last 10 degrees that makes the trouble, and by the way we may add the fuel expense of heating a building in cold weather from 60 to 70 degrees exceeds the total expense of raising the heat from 20 to 60 degrees F. *Sixty to 65 degrees is the "critical point" in heating air. Above that degree (65*

degrees F.) there is positive resistance due, possibly to the low humidity and the relative cost of heating the air and maintaining it at 70 degrees and higher increases in a geometrical ratio. It is a strange co-incidence that this "critical point" should co-incide with the teachings of hygiene and it is also the standard of the greenhouse. One cannot but surmise that there is a fundamental principle which governs both. In other words 65 degrees is the natural maximum temperature considered from the physical, hygienic or economic standpoint. These conclusions are worthy of consideration, for ultimately America will awaken to the foolishness of extravagance, especially where there is involved corresponding health deterioration.

Ventilation standards for varying conditions—dwellings, school rooms, work-shops and hospitals and assembly rooms—are well understood and money is liberally and well expended in that line. It may seem exaggeration to assert that ventilation is ever overdone, but I think that a few illustrations will make it evident that in certain instances such is the fact. In hot-air furnace-heated houses and in all indirect heating systems the air of rooms must be displaced by incoming warm air from once to four times or more an hour to get the proper amount of heat. In cold weather the humidity of the warmed air is near 20 per cent relative. This is a sort of dry kiln effect and the more rapid the change of air (the more ventilation) the more effective the dessication of all material objects in the house. Even the furniture and piano complain. I would assert boldly that it is less injurious from the health point of view to live in an atmosphere a trifle overcharged with carbonic gas and organic vapor having at the same time a healthful humidity than to live almost continuously, as many do, in air having only 20 per cent or less relative humidity and 70 degrees F. and even higher temperature however low the percentage of vitiation. *There is such a thing as too much ventilation when the process is one of gradual reduction of humidity to a point far below the health standard.* In other words excess of carbonic acid gas and organic compounds are not the only constituents which determine the unfitness of the air of habitations.

A study of the relation of air conditions to diseases of the respiratory tract is strictly within our province and I have selected this subject because this group of physicians is peculiarly

qualified to express an opinion. It is a matter of verified observation that the cold months are productive of an increase of catarrhal affections, as well as all acute infectious processes of the respiratory tract. This prevalence of winter catarrh is not creditable, to put it mildly, and calls for consistent effort along the lines of rational hygiene.

It is not possible to make comparisons between this and preceding generations as to adenoids, tonsils and hypertrophied turbinates and catarrhal affections in general, but it is essential to inquire—"Are we more sensitive to temperature variations and more subject to catarrhal affections than formerly and are we making rational effort in the line of prevention during the developmental period when the catarrhal habit is establishing?"

Let us take for example an average condition that obtains in the life of the child. It is fair to state that he lives in a temperature of about 70 degrees at least ten or twelve hours daily. (Bed room hygiene need scarcely be considered. The fresh air propaganda is working better at night than in day time.) During the cold months 70 degrees temperature implies a relative humidity rarely above 25 per cent, and it is positively sad to know that in many furnace-heated school rooms, as well as homes, the relative humidity is below 20 per cent (14 per cent has been recorded). The child habitually and many times daily leaves this unnatural atmosphere and immediately encounters a temperature of say 30 to 40 degrees with relative humidity of 80 per cent more or less. This feels like a cold saturated aerial blanket. There is a positive shock not only in general bodily discomfort but particularly to the respiratory tract. The sudden demand on the nasal radiators produces a degree of reactionary hyperemia that is almost inflammatory. One result of this is a chronic pathologic condition of the mucosa, abnormal anatomic relations and disturbed physiologic function. And worse than that, he gets it "coming and going." He enters this dry, hot atmosphere of the school room or home perspiring after the hurried walk, work or play and the water-vapor next to the skin diffuses into the air so rapidly that his skin is actually comparable to the wet bulb of the sling psychrometer, that is, several degrees colder than the actual room temperature. If he is a thoroughly wet bulb his surface (that is clothing next the skin) may be as much as 10 to 15 degrees colder than the air around him. Even his skin chaps and his

hands, dirtier because of the roughness, are suggestive of the comparable condition of the upper respiratory tract in so far as retention of catarrhal and saprophytic germs are concerned.

This chill due to rapid evaporation of moisture is caused by the dryness and high temperature of the room air and it is the worst combination that obtains to disturb the heat-control mechanism. The skin and nasal mucosa are the chief sources of the afferent warnings to the heat center and vasomotor system and determine physiologic resistance to the shock of sudden changes of temperature. Hot, dry air at the signal station—the nasal mucosa—and a wet, cold skin cause an abnormal and the disturbing combination intensified and prolonged by the unnaturally rapid evaporation.

The secondary effect of this condition is that type of nasal reaction which we encounter clinically—congested turbinates on entering a warm room. Chronic congestion of the turbinates is the result of these sudden changes from dry, hot air to cold, moist air and *vice versa*, and thereby hangs a tale. A very considerable proportion of our work in children and adults is the outgrowth, directly or indirectly, of this perverted and exaggerated functional activity, namely, hypertrophies to the degree of preventing nasal respiration and the development of folds and pockets which are the source of cryptogenous infection, acute and chronic.

And what follows? Surgical correction of hypertrophied turbinates may restore the lumen to approximately normal but perfect functional harmony is not often secured. Certain it is that lacerated and scarred nasal mucosa has lost its keenness as a part of the signal system to the heat center, to say nothing of the destroyed glands, abnormal secretions and bad drainage. We have all had clinical confirmation of this fact,—patients with nasal passages made roomy by surgery, who complain that they have not the normal sensation of nasal respiration. In these rather extreme examples of perhaps too radical nasal surgery we have an exaggeration of the condition which is liable to follow even conservative turbinal surgery. The individual who has lost in any considerable degree that delicacy of nerve function that is of utmost importance in protecting the body against vicissitudes of weather and sudden temperature and humidity shocks is seriously handicapped and the recurrent acute as well as chronic catarrh is evidence of the degree of physiologic perturbation of the upper respiratory tract.

Dust and droplets (minute particles of moisture) are the other ingredients of the air which should be considered in this study. The atmospheric dust is as essential to life as is water-vapor. "No dust, no rain" is the axiom. We can consider bacteria and spores as dust in so far as air currents and moisture are concerned. Dust dissemination in the air of the room is determined by drafts and humidity. Dessication destroys most bacteria rapidly but spores are more resistant. Elaborate and conclusive experiments with factory dust distribution prove that in a moist air (40 to 50 per cent relative) precipitation takes place very promptly. A healthful relative humidity lessens the liability of transmissions of air-borne infections even though dessicative sterilization may be somewhat retarded thereby. Certain it is that a very dry air of high temperature, with the constant drafts resulting therefrom, favors rapid distribution of the dust and germs with corresponding danger of transmission of infection.

The propagation of air-borne infections of the respiratory mucosa is probably more dependent on coughing, than any other factor in distribution—as in whooping cough, for instance. A very enterprising germ, this. It tickles the phrenic and it is dissemination like pollen. The range of droplet infected air is a radius of twenty to ten feet, fore and aft. Coughing is probably more harmful than careless spitting, for it starts active germs in circulation. Now if there is any one symptom that we study and treat in a radical manner, it is coughing, and we merit our claim to special service in disease prevention in part because we eradicate the causes. As with whooping cough so it is with all catarrhal infections. *Coughing is a menace.* Moisture-free air is as a rule dust-charged air in that the available dust content is in circulation. Dry, dusty air is one of the irritants that excites coughing. The conclusion is evident. Moistening the air is a useful therapeutic measure. The psychrometer* is quite as essential as the thermometer in promotion of healthful conditions and comfort and in the study of the etiology and prevention of certain diseases. *"Conditioning" of the air we breathe should become one of the refinements of our special art.* Put a wet stocking on old Fahrenheit and he can tell you some secrets worth knowing.

In this discussion I have tried to impress the fact that the etiology of certain very prevalent acute and chronic diseases of

*The sling psychrometer is the type of humidity meter used in the Weather Bureau service. Most of the automatic apparatus used for this purpose is unreliable. See Weather Bureau Bulletin.

the respiratory tract can be traced to the badly conditioned atmosphere of our habitations and above all I feel convinced that we are not giving sufficient attention to establishing healthful standards. The train of evils following such a national indiscretion is a long one. Neuroses, bad complexions and even absurdities in protective clothing and the vicious estheticism in the dress of this period are hot-house productions. We libel our climate by the tolerance of unhealthful artificial atmospheric conditions. *If 10 per cent of the present outlay in ventilation were diverted to "conditioning" the air it would not take long to educate toward more healthful and more economical standards of artificial temperature and humidity.*

EXAMPLES IN HUMIDIFICATION.

A nine-room house, cubic capacity 30,000 cu. ft., heated by direct radiation (stoves, radiators, etc.), fresh air only by natural leakage, outside air 30 degrees F. 80 per cent relative humidity, would require the evaporation of about eleven pints of water daily to maintain 50 per cent relative humidity at 70 degrees F. Same house and conditions would require six pints of water to maintain 40 per cent relative humidity at 65 degrees F.

The same house, heated by indirect radiation (hot air furnace) air changed hourly—about twenty times daily—outside air 30 degrees F., 80 per cent relative humidity—would require the evaporation of about *twenty gallons* of water to maintain 40 per cent relative humidity at 70 degrees F.

SCHOOL ROOM TESTS.

Sixty-eight degrees F. with 40 per cent relative humidity feels warmer than 72 degrees F. with 20 per cent.

Sixty-five degrees F. with 50 per cent relative humidity feels as comfortable as 70 degrees F. with 20 per cent relative humidity.

Sixty-eight degrees F. with 40 per cent relative humidity represents 10 to 15 per cent saving in fuel compared with 70 degrees, 20 per cent relative humidity.

Conclusion: Establish a proper humidity standard and the temperature of our habitations will drop to a healthful degree.

TEMPERATURE SHOCK EXPRESSED IN HUMIDITY CONTRASTS.

(1) Air, 30 degrees F., 80 per cent relative humidity warmed to 70 degrees has 20 per cent relative humidity.

(2) Air, 30 degrees F., 80 per cent relative humidity warmed and humidified to 70 degrees F., 50 per cent relative humidity.

Note.—The average humidity of the cold months is 70 per cent to 80 per cent in the North Atlantic States and Middle States.

The caloric shock experienced in passing from 70 degrees F., 20 per cent relative humidity into average winter atmosphere, 30 degrees F., 80 per cent relative humidity is chiefly dependent on humidity contrasts. The higher the humidity of the warmed air (up to 50 per cent) the less the caloric shock. Examples: Caloric shock (1) is represented by $80-20=60$; caloric shock (2) is represented by $80-50=30$. Caloric shock is the chief factor in the causation of so-called winter catarrh of the respiratory tract and the consequent anatomic abnormalities and physiologic disturbance result in permanent pathologic conditions.

515 Nicholas Building.

Modification of the Brophy Mouth-gag. R. E. FARR. *Jour. A. M. A.*, May 16, 1914, p. 1557.

The modification consists in a hinge attachment. When closed this instrument can be more easily introduced into the patient's mouth where it can be opened as wide as needed. Ed.

Treatment of Acute Frontal Sinus Inflammation. K. M. MENZEL. *Monatsh. f. Ohrenh.*, Heft. 3, 1914, p. 334.

In order to avoid the removal of the anterior part of the middle turbinate, the writer advocates its "bloody" subluxation downward towards the inferior turbinate, after loosening it from its attachment by means of a special chisel. The hiatus semilunaris is then easily accessible and the frontal cavity may be irrigated.

GLOGAU.

THE DEAF

**Their Education—Improvement of Conditions—
Responsibilities and Participation of the Profession.**

JOHN DUTTON WRIGHT, M. A.
DIRECTOR OF THE WRIGHT ORAL SCHOOL FOR THE DEAF
NEW YORK CITY

The aim of this department of *THE LARYNGOSCOPE* will be to bring to the notice of its readers from month to month, facts that may be helpful to physician and patient in dealing with the life-problems involved in deafness. Suggestions from readers will be gladly received and all questions answered to the best of our ability.

THE EDUCATIONAL NEEDS OF THE DEAF.

(Continued from the July, 1914, issue, page 693.)

We now come to Class II. Adults. Group A. Adults with hearing but slightly impaired by conditions that will yield to treatment: While at first sight it may seem that the educational phase need not be considered with these patients, yet training in lip-reading may be of considerable assistance in solving the problem. If the process of cure is likely to be somewhat prolonged and to require all the nervous energy available on the part of the patient, a great relief from nervous strain and an added contentment can be secured by acquiring some ability to assist the ear with the eye. Then, also, there is always the possibility that in time the patients may find themselves in Group B.

Group B. Adults with hearing slightly, but permanently impaired, with or without the probability of a progressive increase in deafness: For these people, the educational training of the brain to interpret language by the movements which accompany speech is a great aid. By facilitating their intercourse with people it encourages them to mingle more freely in society. This, in turn, leads them to pay more attention to what is said around them, and so gives their hearing more use. As a matter of fact, we hear with our brains. If the organ of hearing is not in perfect working order the brain must exert more effort to interpret the sounds; just as one must listen with great intentness when using a defective or faint telephone. If the brain can receive a little assistance through the eye, in supplement to the faint impressions that reach it through the ear, then there is less brain-fag, less nervous tension, and the whole bodily machine works better. It is easier to hear language

than to see it, and even the slightest sounds of speech that are heard enormously help the eye to comprehend and are eagerly sought. The result, therefore, of adding the help of the eye to that of the ear is to increase the amount of use the patients make of their hearing, and curiously enough they not infrequently report that their hearing appears to have benefited from the educational training of lip-reading. The intelligent teacher will use, in giving the lessons, such a volume and pitch of voice as will exercise the hearing to the utmost, while supplementing it with sight. So that, with the eyes closed, the patient could hear the voice, but not be able to make out the words, and with ears stopped could see the words, but not quite make out their meaning, though with both ears and eyes open the sentences were readily understood. Thus the two senses are trained to work in supplementary harmony.

Group C. Adults with hearing seriously and permanently impaired: All that has been said of Group B is applicable to patients belonging to Group C, and in proportion as their situation makes social intercourse more difficult for them so much the more is the educational training a help and a comfort to them.

In three or four months ordinary persons can get a sufficient start in lip-reading to enable them to make steady progress in increasing their facility under the social conditions of every-day life without further special aid or instruction.

Unfortunately, the United States is the one great stronghold in all the world of silent, that is manual methods of educating the deaf. These silent methods are responsible for the term "deaf-mute" that is so strongly entrenched in our language, although in thousands of instances it has become a misnomer through the education of the deaf by purely oral methods. In Europe the greater part of the schools are purely oral schools, but in the United States the greater part of the schools use silent methods to a considerable extent. To be sure, they have gradually been compelled, by the arrival and persistent growth of the oral method, to adopt it in part, and call themselves "combined" schools. But, so far as the output of the schools is concerned it is not possible to combine the two methods. The pupils leave the so-called "combined" schools practically deaf-mutes, and so long as "combined" schools exist there will be need in the language for that term.

By providing a small, separate building in which the entering children could be housed, taught and cared for by speech methods, and year by year increasing the accommodations assigned to the orally taught pupils and decreasing the portion needed for the

silently taught, each of the state "combined" schools could, in a period of from eight to ten years, be transformed into purely oral schools. But absolute segregation must be secured of the manually taught from the orally taught, not only in the class rooms but also in recreation, shop, dining hall and dormitory. If the modern and enlightened cottage plan were adopted by the State institutions for the deaf this much to be desired transformation would present very little difficulty.

Physicians and their organizations are always an influential factor in each State and community, and if they would steadily, year after year, exert their influence on behalf of the transformation of the State institutions for the deaf from so-called "combined" to real oral schools, they would help to hasten the arrival of the change.

Four Cases of Leeches Adhering to the Larynx. HENRI
ABOULKER. *Rev. hebdomadaire de Laryngologie*. May 23, 1914.

The first patient applied because of a sudden hemorrhage from the throat and was relieved by the removal of a leech which had entered his throat while drinking at a public fountain. The leech was found adhering to the left arytenoid, but the patient had found no inconvenience from its presence either in breathing or swallowing.

In the second case, a beggar declared that he had swallowed a leech while drinking from a pond. Some hours afterwards, he developed a violent attack of suffocation for which he was sent to the hospital. The dyspnea became intense but was relieved by the removal of a large leech which was found attached to the vestibule of the larynx.

In the third case, a man complained of the loss of voice and slight dyspnea which he attributed to a leech which had entered his throat some days ago while drinking from a pool. As in the other cases, the leech was removed by forceps, the point of implantation being one of the superior vocal cords.

In the fourth case, the patient also declared that he had swallowed a leech. There was no spitting of blood or difficulty of respiration, but only a slight discomfort in the throat, as from a foreign body, in the effort of swallowing. The leech could be easily seen, but while the right side of the vestibule appeared edematous, the point of attachment could not be found.

SCHIEPPEGRELL.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular meeting, May 27, 1914.

DR. J. HENRY GUENTZER, CHAIRMAN.

Jugular Thrombosis (Normal Ear) Complicating Cervical Adenectomy: Jugular Resection: Recovery. DR. JAMES GARFIELD DWYER.

The patient was admitted on January 31, for ordinary cervical adenectomy,—in the service of Dr. Coffin. The notes of the operation are as follows: Skin incision, four inches long, on right side of the neck. Large broken-down glands. One big gland and many smaller ones were removed.

For four days after the operation, the child continued in splendid shape, with normal temperature. Then the temperature jumped up to 106°. At the time of the operation, the child was practically exsanguinated, and they used transfusions and hypodermoclysis for five days afterwards. The case was then turned over to Dr. McKernon, and its general condition improved so far as the anemia was concerned, but the other symptoms became more pronounced and it was decided to tie off the jugular as far as possible. We went right down to the clavicle and got a healthy wall, and gradually dissected up to the foramen. The operation on the jugular was below the facial vein, and the vein was patent below. On taking the culture, we got the longest chain of streptococci I have ever seen. We gave the child autogenous vaccine made from the interior of the vein, and the child went on to complete recovery.

The case was interesting, as the thrombus did not extend into the bulb, in the situation that is the ideal one for thrombosis. We have a whole jugular vein closed up to the facial vein, and also the vein itself on being excised was put through the pathological technic and the streptococci demonstrated in the wall of the vein.

Dr. Dwyer said that this was the first case of the kind that he had ever seen.

DISCUSSION.

DR. CARTER asked Dr. Dwyer what was the usual length of the streptococcal chain; and also whether there was any connection between the length of the chain and the virulence of the organism.

DR. GUTTMAN said that if he understood the situation aright, it was an operation for suppurative glands, and that accidentally the jugular was injured and excised.

DR. DWYER: Yes, two weeks after.

DR. GUTTMAN. Did it have any connection with the ear?

DR. DWYER. It had no connection with the ear.

DR. HELLER asked if there was much breaking-down of the glands, or whether they were comparatively clean?

Dr. DWYER said that it had always been accepted among bacteriologists that a long chain of streptococcus generally represented a virulent strain. The streptococcus longus was the virulent form; and the streptococcus brevis,—5 to 6,—was looked upon as the non-virulent form although this is only a rough way of differentiation. Streptococcus longus, when injected into rabbits, usually produces septicemia, whereas the other is innocuous. This chain, however, was the longest he had ever seen.

The deep glands were broken down; the glands around the jugular were still solid and firm. The ear was absolutely normal. The case had been referred to him from the nose and throat department, as it was thought that a mastoid operation would have to be done; but free bleeding was obtained above and below and the thrombus was take out.

Dr. HELLER asked if the caseous pus was examined for streptococci.

Dr. DWYER replied in the affirmative, and said that no streptococci were found in the pus.

Orbital Abscess with Optic Neuritis, Due to Acute Ethmoiditis in a Child; Operation; Recovery. Dr. J. H. GUENTZER.

DISCUSSION.

Dr. GUTTMAN said that twelve years ago he had reported a somewhat similar case. The antrum of Highmore was affected, and then the ethmoidal sinus, and it broke into the orbit. He believed that the pus of an ordinary ethmoiditis broke into the orbit; this caused the pressure on the orbital nerve and the optic neuritis, and by the evacuating of this abscess the whole picture cleared up.

Dr. WILSON said that he had reported a similar case some six or seven years ago, and possibly the condition is not so rare as one would imagine.

Dentigerous Cyst of Superior Maxilla. Dr. GERHARD HUTCHISON COCKS.

The patient, Solomon R., is 50 years old. His health has been good except for the present trouble. There is no history of venereal disease. Six months ago his face began to swell in the region of the right antrum; the teeth adjoining the antrum were tender and painful. At this time a large abscess of the palate was evacuated. There has been a discharge of pus from the tooth-root cavities since the removal of the teeth, six months ago. During the past five months there has also been a continuous discharge from the right nostril. Two weeks ago, two bicuspid tooth-roots were removed. This was followed by a foul discharge of pus from the tooth-socket, which has persisted until the present time.

When first examined, there was pus in the right nostril in the middle turbinated region, and pus coming down through the bicuspid socket into the mouth. A probe could be run up through this tract for a short distance, but failed to enter a large cavity. X-ray examination showed a cloudy antrum and a large cavity just below the antrum which involved the alveolar border. You will note that in one place the entire bony alveolar process has disappeared.

On April 29, 1914, under gas-ether narcosis, a transverse incision was made through the muco-periosteum over the canine fossa, as in the Caldwell-Luc operation. The periosteal elevator broke into an oval cavity about an inch and a quarter long, containing a thickened lining membrane and

foul pus. The bony walls of this cavity were smooth. At first I thought I was dealing with the antrum, and therefore made a counter opening from the inferior meatus directly into the cavity. On more careful examination, I discovered a small opening from the roof of this cavity leading above into an unusually large antrum. As the antrum was also diseased, the two cavities were converted into one large cavity by breaking away the intervening partition, and the nasal wall was removed, both above and below the inferior turbinate bone. The muco-periosteal incision over the canine fossa was closed, and drainage and subsequent treatment carried out by the nasal route.

The diagnosis of this case is infected dentigerous cyst, with perforation into the antrum. Recovery was uneventful.

Tuberculosis of the Maxillary Antrum, with Tubercle Bacilli Present in the Washings from the Antral Cavity. DR. GERHARD HUTCHISON COCKS.

(This case is from Dr. Chappell's Clinic at the Manhattan Eye, Ear and Throat Hospital.)

The patient, Max O., a man 34 years of age, has always been subject to slight nasal obstruction, for the relief of which he states that a spur was removed from his nose twelve years ago. His family and personal history are negative.

Two years ago he developed pulmonary tuberculosis, with loss of weight, fever, and night sweats. After a few months of rest and treatment, he went back to work and has been comparatively free from constitutional symptoms since he recovered from the acute attack.

On March 15, 1914, he first began to suffer from pain and swelling of the left side of the face over the antral region. On April 13, he came to the Manhattan Hospital for treatment. Transillumination demonstrated a dark left antrum. X-ray examination showed a very cloudy antrum on the affected side, with slight cloudiness of the opposite antrum. The other sinuses were comparatively clear. The left antrum was perforated through the inferior meatus. The washings contained large, tenacious clumps of muco-pus of a peculiar orange-yellow color. Dr. Dwyer, the hospital pathologist, reported that the antral washings contained large numbers of tubercle bacilli and many secondary organisms.

The patient has returned to the clinic at intervals during the past six weeks to have the antral irrigations continued. The discharge from the antrum is clearing up, and his condition is improving. At the present time, his chest gives the signs of an arrested apical infiltration. He states that the examination of his sputum has always been negative to tubercle bacilli.

The method employed by Dr. Dwyer to determine the presence of tubercle bacilli in the washings from the antrum was as follows: The material was first subjected to antiformin, which does away with all organisms except the acid-fast group. There are several acid-fast organisms which were excluded, as follows: 1. Leprosy bacillus. This has never been isolated free from tissues. 2. The Timothy hay-bacillus and the smega bacillus, if present, would have been decolorized by the stain used (Pappenheim's). 3. Acid-fast bacilli are sometimes found in distilled water. This group was excluded by using water which was distilled twice.

The patient is being treated in the day camp on the roof of the Vanderbilt Clinic, where he is receiving tuberculin injections. The discharge from the antrum is now very scant and the antral lesion is apparently clearing up rapidly.

DISCUSSION.

DR. FREUDENTHAL, referring to the case of the dentigerous cyst, said that he had seen two similar cases. In the first instance, the patient was a lady from Chicago. She had been suffering from a foul-smelling discharge from the nose for eight years; she had been treated by a dentist, then operated on by a laryngologist, but with no improvement.

On examining the antrum he had found the same conditions as described by Dr. Cocks,—one closed cavity and another big cavity, which was really the antrum. The cyst was removed, and the patient got well in two weeks. There had been a great deal of pus in the antrum.

Referring to the case of tuberculosis of the antrum, Dr. Freudenthal said that he had seen many cases of tuberculosis with a purulent condition of the nose, and he had often wished to make a careful examination of all these cases for tuberculosis. He hoped that some one would make such a study, for he was convinced that many cases of empyema of the frontal and other sinuses are due to this condition.

DR. COCKS said that the patient with tuberculosis of the antrum stated that his sputum had been examined several times for the tubercle bacillus, with negative result. It was therefore likely that the tubercle bacilli came from the throat or naso-pharynx.

DR. FREUDENTHAL said that a patient had come to the clinic the previous afternoon complaining of hoarseness only; there was no pain, no cough. Examination showed a very unusual condition in the larynx, which seemed of interest in connection with the paper he was to read. There was a big mass in the larynx, at the anterior commissure, closing up that part, and above that another mass with an edematous or cystic appearance. He had not thought of tuberculosis in this case, but to make sure, the chest was examined, and sure enough a lesion was found in the lungs. He did not need to describe the case, as anyone who was interested could examine the patient.

DR. DANZIGER said that both of the two masses which he saw appeared to originate from the posterior surface of the anterior wall and did not impress him as being tubercular, but looked more like papillomata. Tuberculomata are of firmer consistency and are hardly ever found in this location; their preferred location is in the inter-arytenoid fold or the vocal cords. The fact that the patient had no pain did not speak against tuberculosis, as the epiglottis was free. The masses were absolutely spherical, almost pedunculated, another point which spoke against their being tubercular.

DR. FREUDENTHAL said that he intended to remove the masses and try to get a true diagnosis.

The Management of Laryngeal Tuberculosis in Sanatoria and Private Practice. DR. WOLFF FREUDENTHAL.

The essayist stated that it was not his intention to go into the details of the etiology of pulmonary tuberculosis. As everyone knows, it is preva-

lent to a dreadful degree, and in spite of the active,—often rational, often nonsensical—crusade against it, it has decreased to only a slight extent. As a result of a large number of post-mortem examinations, Naegeli stated that in 97 per cent of all adults some kind of tuberculous lesion was found, and concluded that "every grown person has tuberculosis." (*Virchow's Archiv.*, Bd. 160, 1900). This tends to show that an occasional infection is not dangerous to the average person. To those exposed, the danger lies in the constitutional weakness of the individual, or in close and prolonged contact with tuberculous patients.

Laryngeal tuberculosis is the most severe and dangerous involvement of the disease. Few patients in any condition demand relief more earnestly or spur the physician to more effort, or are a source of greater anxiety. Indeed, many practitioners still believe that tuberculosis of the larynx is an incurable disease. A physician in charge of a large hospital for tuberculous cases said recently: "The patient is lost as soon as the larynx becomes involved." Statistics, however, show the fallacy of this belief. W. Jobson Horne, of London, who has conducted extensive clinical and pathological research, found that 97 per cent of cases of phthisis at one time or another in the course of the disease experienced symptoms referable to the larynx, and claimed that a routine examination of the larynx in persons suffering from symptoms suggestive of early pulmonary disease would often enable a diagnosis of phthisis to be made at a time when the stethoscope yields no evidence, and that is at the time when the physician can be of the greatest service to his patient.

Whether or not these statistics are accepted, all men of experience will agree that the larynx is affected in an extraordinary large percentage of cases, and it is equally obvious that many of them are cured, with or without a diagnosis and with or without treatment. It is equally certain that a certain proportion of the milder cases get well simply by being placed in proper hygienic surroundings.

The writer then dwelt upon the treatment of these cases in a well-equipped sanatorium. It should be an established rule to examine thoroughly the upper air tract of every case that enters a sanatorium, whether the patient complains or not. If this is done as a routine procedure, a number of pathological conditions will be found, the correction of which will have a decidedly beneficial effect, not only locally, but also as regards the pulmonary conditions. Many of these patients suffer from an atrophic catarrh of the nose or from milder form of this, rhinitis sicca. The mucous membrane of the nose is dried out or covered with scabs and crusts,—the air spaces are large enough, but the air itself cannot be assimilated. The characteristic hacking cough described in all the text-books as a premonitory or incipient stage of pulmonary tuberculosis often has its source in the pharynx, being caused by the dry secretions of atrophic rhinitis getting into this region from the nose, or by a post-nasal catarrh. If these conditions are treated according to the customary methods, the cough will be eliminated, and in this way much can be done toward arresting the disease in the beginning.

(To be continued.)

PHILADELPHIA LARYNGOLOGICAL SOCIETY.

Regular Meeting, May 19, 1914.

DR. E. B. GLEASON, Chairman.

DISCUSSION OF DR. HILL'S PAPER.

(Continued from page 708.)

DR. GWATHMEY (closing): With oil-ether constant vigilance is the watch-word. Be on guard to keep an open air way. Danger signals, when present, demand some urgent remedies as in other methods of anesthesia.

DR. GRAYSON: I am not irrevocably committed to chloroform; I always use anesthetic adapted to condition, and never use chloroform when objections are raised by the physician or by the family. Always feel responsible for anesthetic and results and always have it given by resident under my constant supervision.

DR. MUELLER has never used oil-ether; deferring until he had heard further from Dr. Gwathmey. Intra-tracheal anesthesia especially applicable in head and neck surgery. Operations on chest are rare. Strongly objects to interne administering ether. Hospitals have no right to train young men at expense of patients and all should unite in forcing hospitals to employ trained anesthetists.

SYMPOSIUM ON BACTERIN TREATMENT.

The Use of Bacterin in the Treatment of Diseases of the Nose and Throat.

DR. FIELDING O. LEWIS, Philadelphia.

Published in full in the July, 1914, issue of THE LARYNGOSCOPE, p. 673.

Vaccine Treatment in Accessory Sinus Suppuration. DR. ROSS HALL SKILLERN, Philadelphia.

Published in full in the July, 1914, issue of THE LARYNGOSCOPE, p. 676.

Bacterins in the Treatment of Diseases of the Ear. DR. GEORGE M. COATES, Philadelphia.

Published in full in the July, 1914, issue of THE LARYNGOSCOPE, p. 677.

DISCUSSIONS:

DR. ROBERT F. RIDPATH thinks that the beginning of therapy by bacterins will have to be thought of by bringing before our memory the origin and use of vaccines or original vaccination of cow-pox by Jenner. He started the thory and treatment, although somewhat different in technic and perhaps dissimilar in other details, but nevertheless due to his forethought and experimentation and his finding that by inoculating with cow-pox we have a preventative of small-pox. From this time onward we have had a gradual but steady succession of vaccines, antitoxines, phytocogenes, bacterins, etc., for combating diseases in the various forms and manifestations.

Dr. Ridpath's experience although somewhat recent and small in number, nevertheless shows results obtained which to his knowledge could not have resulted from any other medication. His cases comprise: Four cases of acute maxillary sinusitis; one case of frontal sinusitis; two cases

of chronic otitis media; one case of acute otitis media. With the exception of one acute case of maxillary sinusitis and the two cases of otitis media, all of the cases were not only improved but cured.

In this case, an acute one, Mr. C., age 46, injection not only did no good but seemed to aggravate the condition, giving a decidedly bad reaction inside of twelve hours; an almost continuous chill; fever of 104° lasting ten hours; delirium and tremendous prostration, with general increase of sinus symptoms and discharge. These symptoms were not relieved by washing out of sinus.

Like the many cases which Dr. Skillern has quoted in his paper all of the cured cases seemed to be markedly better from initial dose or first two or three injections, and from then on symptoms and discharge decreased.

As Dr. Ridpath has had several complaints of injection producing sore arms with decided swelling sometimes he has lately injected bacterins intermuscular instead of subcutaneous.

He thoroughly agrees with Dr. Skillern that bacterin treatment should follow all radical operations. He was very glad to hear of the use of bacterins in ozena, which Dr. Lewis mentioned, and felt that all should work to a common end in this supposedly incurable condition to find a remedy that will do some good.

Dr. Lewis speaks of reaction following injection. It has been Dr. Ridpath's experience, with one exception, that the more decidedly negative the reaction the more benefit he would have from his injections.

Just as antitoxin for diphtheria was formerly given as last resort, now bacterins are given as last resort, and equally so that antitoxin for diphtheria is now given first, bacterin should, and he predicts in the future will be given first instead of last and the sooner general practitioners are educated to this fact the fewer radical operations, with their long-drawn out after-treatment will have to be performed. Even if by bacterin treatment only a few cases of an otherwise incurable condition are cured, Dr. Ridpath thinks all will agree that it is worth trying.

Dr. Ridpath thinks it would be a proper procedure always to have a culture made of the discharge to determine the infecting organisms before starting injections of bacterin, haphazard, without knowledge of particular organisms causing it, as otherwise failure may take place and treatment receive a black mark when it would be our own fault by not instituting or injecting the proper bacterins.

DR. LESLIE FRANK MULFORD: In Dr. Coates' service at Pennsylvania Hospital Sherman's stock vaccines have been used by subcutaneous method in twelve cases, no reaction. In two cases severe cellulitis. Autogenous polyvalent vaccine (Sherman) used and both improved promptly. All injections in same site in spite of hyperemia. When no results obtained dose always increased to 2 ccm. Dr. Mulford referred to case of infected knee, cured with Sherman gonococcic vaccines. When Dr. Mosher was dangerously ill with pneumonia prompt administration of stock vaccines he believes hastened his recovery.

DR. GEO. W. MACKENZIE said he agreed with Dr. Skillern relative to the use of vaccines in acute cases; in 80 to 95 per cent marked improvement

or recovery; results often brilliant. Much disappointed with use of vaccines in chronic cases. Experience limited to thirty or forty cases; some improved, but hardly a perfect result in any one of them. Believes better results can be obtained in combination with operative or mechanical treatment. He had a case of virulent streptococci infection of middle ear; labyrinth destruction, operation; erysipelas; meningeal symptoms; delirium. It was a desperate case; he used phylacogens; patient cured. He had another case of fracture of skull; inner ear destroyed; brain involvement; operation; brain drained; bad breathing; low pulse; desperate; brilliant result with phylacogens. He believes that many acute cases cited cured with vaccines might be cured without them. A more intelligent understanding relative to the value of vaccines can be obtained by first treating a series of cases by older methods, another by no other than vaccines or bacterins, and still another by combined methods. Vaccine therapy not similar to method introduced by Jenner. Latter used attenuated small-pox or cow-pox and produced disease like small-pox.

DR. E. B. GLEASON referred to disagreeable local and constitutional symptoms following use of vaccines. Another weak point is that in acute cases of all infections there is a remarkable tendency to get well.

DR. SAMUEL P. STOUT has recently employed serobacterins with success. Noting but little local or constitutional reaction; the doctor is opposed to phylacogens, patients often becoming desperately ill.

DR. LOUIS J. BURNS suffered from antrum trouble himself and was miserable. Instead of A. used one-half of B.; chill, elevation of temperature, reaction decided; tenderness gradually disappeared, no recurrence. In eighteen nasal cases he used a bacterin immediately; then in three days one-half contents of syringe (Mulford) B., in four days another half of B. In twelve cases pronounced results. In two acute cases no results. Two chronic cases no results. Best results obtained with elevated temperature, 100.3°, 101°, then went to C. and no rise in temperature. To get good results one must get negative phase. With subcutaneous injections, some reaction in a few cases. No bad results with deep intramuscular injections in inter-scapular region. Of eighteen cases, eight are one year old with no return of symptoms. In one acute case there was pronounced recurrence of symptoms, probably due to caries of tooth in antrum. Ear cases of purulent otitis media at St. Christopher's Hospital; good results in five out of seven. The doctor does not depend absolutely on bacterins but combines with internal and local or operative treatment, therefore deductions must be made. Used stock vaccines in all cases.

DR. WILLIAM A. HITSCHLER said some of his results were brilliant, others more or less disappointing.

DR. G. N. ILLMAN said bacterins were first used eight or ten years ago in old bone lesions. In 1906, bacterins were first used in chronic sinus conditions and one year later Dr. S. MacCuen Smith employed them in several antrum cases following operation. Favorable results can only be obtained with good circulation, free and open drainage and live granulations. Useless waste of time to use bacterins in closed cavities in fetid condition. A standing order at Samaritan Hospital to use pneumo-bac-

terins at earliest moment in all cases of lobar pneumonia. Reaction at point of injection argument in favor of deep injections. In regard to commercial and autogenous vaccines there is no question regarding the superiority of the latter. Three strains are all sufficient. Phylocogens have twenty-two strains. Negative phase may be desirable but not the old-time negative phase following use of phylocogens.

DR. HERBERT M. GODDARD said he had used eight injections of stock vaccines in a case of ozena; patient examined one month later, no improvement. The doctor emphasized the importance of keeping stock vaccines at even temperature. Thus more favorable results are obtained in office-practice because hospitals usually fail to provide dispensaries with necessary equipment.

Diathermo-kinesiphony or the Auditory Re-education by Means of heat. A. MAURICE. *Rev. hebdomadaire de Laryngol.*, May 16, 1914.

Diathermo-kinesiphony is described by Maurice as a combination of thermo-penetration or diathermy combined with auditory re-education.

Diathermy is a means of applying currents of high frequency which the author applied by means of an apparatus adapted from the apparatus described by Arsonval about twenty years ago. The current is applied by means of large electrodes which permit of great penetration of heat, but which allow at the same time the passage of sonorous vibrations, the electrodes being applied to the ears on each side. A current from 1500 to 1800 milliamperes is allowed to pass for five minutes, then without stopping the high frequency current, special phone receivers are applied to the ear, the sonorous sensations of which are applied directly to the ear.

Diathermy possesses a triple action—revulsive, the relief of congestion and analgesic, while phonoid massage has a trophic effect, the relief of congestion, besides a sedative and mobilizing action. In view of this, the author believes that a combination of these two methods is especially effective.

This treatment is indicated in cases where there are subjective noises and recurrent pains, in serous otitis as well as subacute catarrhal cicatricial, sclerotic and chronic otitis media. Sclerotic otitis media are benefited only to the extent of diminishing subjective noises.

SCHEPPEGRELL.





Josef Gleitsman

IN MEMORIAM.

Joseph William Gleitsmann was born July 22nd, 1841, at Bamberg, Germany. His father, also a physician, was of a prosperous and influential family. The subject of this memorial received his early education at his birthplace and at Eichstaedt and studied medicine at Wortzburg, Munich, Berlin and Vienna, taking the degree of M. D. at Wurtzburg, in 1865, and acting as interne at the city hospital at Bamberg. Later he entered the Medical Corps of the German Army and as Military Surgeon in the war with Austria in 1866, acquitted himself with distinction, receiving from the Emperor at the close of the campaign the order of the Iron Cross. His military service was continued throughout the Franco-Prussian War in 1870, when he again showed marked ability and again received a medal of honor. At the close of the war he accepted a position as ship's surgeon and made a number of interesting voyages. Following this he came to the United States, in the early seventies, and having taken up the specialty of diseases of the throat and lungs, settled in Asheville, North Carolina, where he established a sanitarium.

In the early eighties he came to New York and thereafter made that city his home, speedily establishing himself as a specialist of unusual merit and associating himself with leading medical societies and institutions. While at Asheville, in 1880, he was elected a Fellow of the American Laryngological Association. He had already been elected to the Medical and Chirurgical Society of Maryland. After making his residence in New York he became a member of the New York Academy of Medicine, the New York County and State Medical Associations, the Medical Association of Greater New York and the German Medical Society.

Dr. Gleitsmann was elected vice-president of the American Laryngological Association in 1901, and its president in 1905, presiding over an unusually successful meeting held at Niagara Falls. In 1885 he was elected Professor of Laryngology and Rhinology at the New York Polyclinic Hospital and Medical School, a position which he held for many years with distinction to himself, and credit to the school. He was also Senior Laryngologist and Otolologist to the German Dispensary and Laryngologist and Otolologist to the German Hospital.

As will be seen from the appended bibliography, Dr. Gleitsmann was, throughout his career, a frequent contributor to the literature

of his department. His articles were always well in advance of the time, scholarly and scientific. His addresses were also of a high order of excellence. During the earlier period of his practice he wrote mainly upon subjects connected with tuberculosis, but soon extended the scope of his studies until they covered the whole field of laryngology.

In the department of original invention he showed much ingenuity, his cutting laryngeal dilator, for example, being quite different in design from anything that had preceded it and admirably adapted to its purpose.

Dr. Gleitsmann participated in several International Congresses, among them those at Berlin in 1890, Moscow in 1897 and Buda Pesth in 1911. Upon the latter occasion he was appointed a member of the Executive Committee of the International Congress of Laryngology. Among the German Medical Institutions of New York he maintained a high position. He was an honored member of the Liederkrantz and of other German societies and for many years a Trustee of the German Medical Society of New York. In this capacity he shared the responsibility of caring for the funds devoted to fellow members in distress. No official report was ever required but it is said of him by his fellow members that he carried out the duties of the position with rare tact, and that he was always ready to extend the kindest sympathy and the wisest advice.

Outside of medicine, Dr. Gleitsmann was a scholar, a man of extensive reading and of considerable appreciation of art. Above all recreations he was an intense lover of nature. His grand passion in this direction was mountaineering and there were few places in the Swiss Alps or the Australian Tyrol with which he was not familiar. His ascents were of the most famous; they included the Matterhorn, Mt. Blanc, Ortler and many others. His knowledge of Europe in general made him an invaluable traveling companion while the brightness and geniality of his disposition and the kindness and generosity of his nature caused him to be a most enjoyable one, as the writer, from many delightful experiences had ample opportunity to prove. But as a companion of travel so he was in all the relations of life. Earnest and thorough in all that he undertook, kind and generous to a fault, refined, scholarly, accomplished; a gentleman by nature and at heart, a loving and loyal friend.

D. BRYSON DELAVAN.
